

# THE IRON AGE

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## Contents—March 14, 1935

Star Salesmen Wanted.....	9
Plain Jolt Machine in Jobbing Foundry.....	10
Finish Helps Metal Products Sales.....	14
Lubrication Guidance Helps Hold Customers.....	18
Brittleness in Steel.....	21
Old Age Pensions.....	26
New Equipment.....	34
Automotive Industry.....	38
February Ingot Output.....	41
News.....	41
Personals and Obituaries.....	43
Washington News.....	45
Statistics on Metal-Working Activity.....	54
Markets.....	55
Construction and Equipment Buying.....	78
Products Advertised.....	118
Index to Advertisers.....	140

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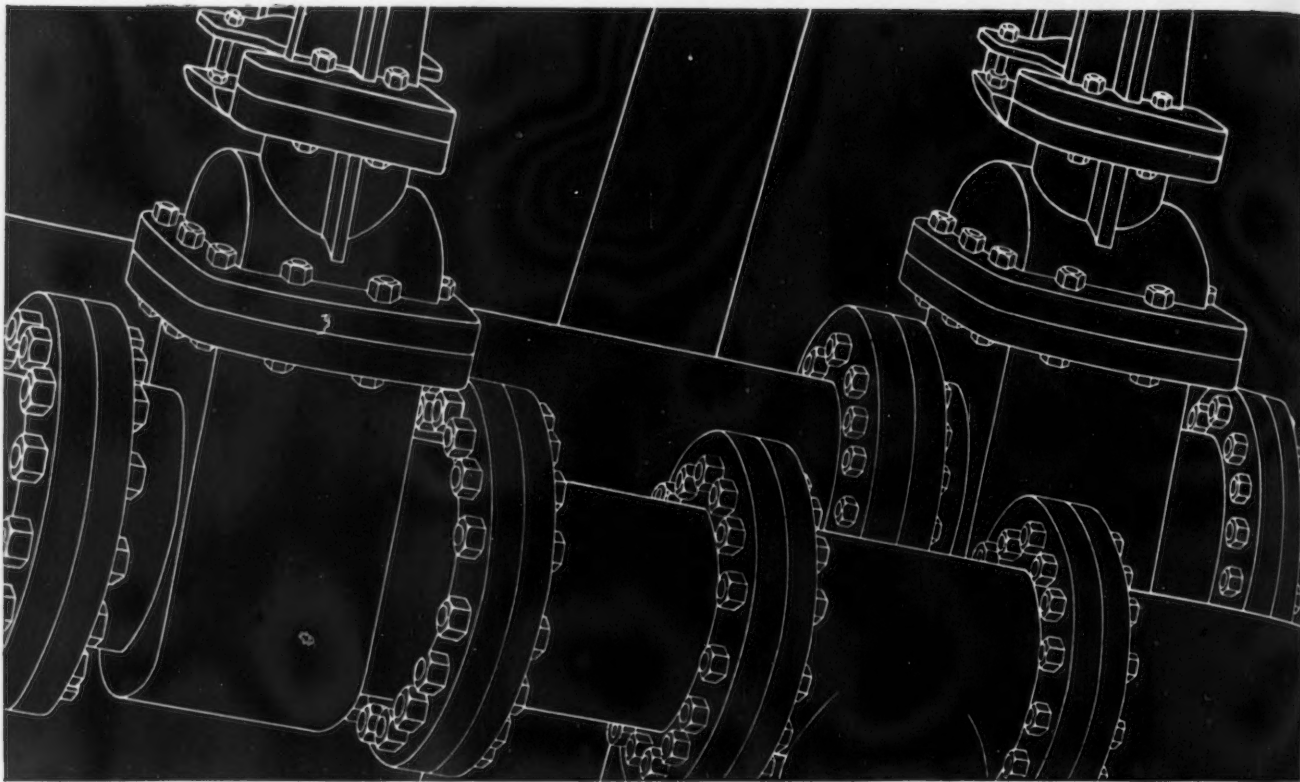
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"The medium-carbon, hot-made, oil-quenched nuts, as made by Bethlehem Steel Company, distorted approximately 57 per cent less—" (than the next best nuts), they reported. "In view of the good results obtained with these nuts we would recommend their use on alloy-steel bolting."

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Just as high-temperature requirements are best met by the Bethlehem Hot-Forged Nut, Oil-Quenched, so there are many heavy-duty applications where the Hot-Forged Nut will give exceptional service. It's the logical nut for punishing tasks.



**BETHLEHEM STEEL COMPANY**

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# ▲▲▲ THE IRON AGE ▲▲▲

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## Star Salesmen Wanted

**T**HERE are some fundamental principles which are recognized and accepted as basic in successful sales management.

One of these is to make and maintain proper contacts with influential prospects. Another is to exercise good judgment in proportioning the expenditure of sales energy.

To illustrate by citing "opposites," it would **not** be good management to permit your competitor to monopolize contact with your most important customers, men whose buying decisions could make or break your business. Nor would it be good management to keep star salesmen gunning for ten-dollar orders when their aim and ammunition are equally capable of bagging ten thousand dollar ones.

Elementary, isn't it?

Then why do you not apply these principles to the most important selling job that you have had or probably ever will have to do; a sales job that will determine, unquestionably, the future fate of your business?

Let's consider what has happened to bring this sales opportunity about.

There was a time when your volume and profits were determined by the developments in seller and buyer relations. That was before the depression. Then came the NRA, with the transfer of control of industry and hence of your volume and profits into an Administrative branch of Government. And now, as the sadly plucked Blue Eagle is preparing to fly away, comes another transfer of control; not back again to seller and buyer, but to Congress.

Make up your mind to it that there is where final decisions governing your volumes and your profits are going to be made for some time to come.

Your competitors, the A. F. of L., as well as all of the other anti-initiative, anti-indus-

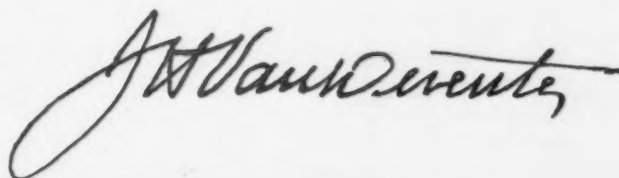
try, anti-business groups, who preach the doctrine of essential conflict between employer and employed, recognize this fact. **And they are virtually monopolizing the contacts with men whose decisions will make or break your business.**

Right now, these competitors of yours have several hundred of their star salesmen at work selling Congressmen, through individual contact, the 30-hour week idea, the Wagner-Lewis bill, a social security program that is but ten per cent thought out, new teeth for 7-a, prevailing wage rates for relief work and a long list of other high-priced products.

These salesmen, your competitors, are out after billion-dollar orders while you are concentrating on ten-dollar ones. They will get the order unless you get busy, and it will be because of superior salesmanship.

Industry should organize its star salesmen in every community, now, in a personal sales campaign devoted to individual Congressmen. Sell them the fallacy of your competitors' 30-hour week and the superior merit of the practical idea that only by producing goods can we all enjoy them. Get these Congressmen to visit your plants and talk to your workmen so that they will come to realize that mutuality of interest, not antagonism, is the philosophy to be fostered.

Here, indeed, is a sales campaign involving billions in future volumes, wages and profits which should intrigue the liveliest star salesmen of our industry!



# Plain Jolt Machine Overlooked In

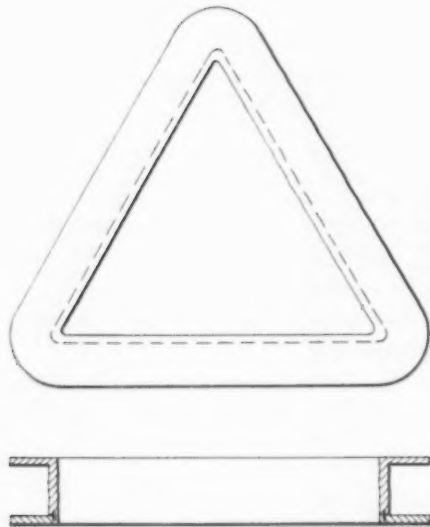


FIG. 1—Triangular base pattern, lower flange loose, dowelled to body.



**OBSERVATION** of molding methods in the general jobbing field, as noted in the heavy industrial area enclosed in a rough triangle drawn from Boston to Winnipeg, south to St. Louis, then back east by north to Boston, would indicate that, with the usual proportion of brilliant exceptions, opportunities of using a valuable piece of foundry equipment in the form of the plain jolt machine are often overlooked.

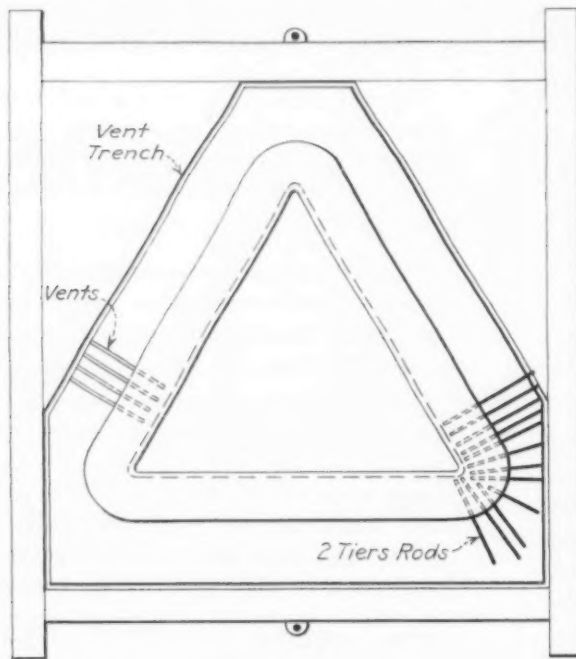
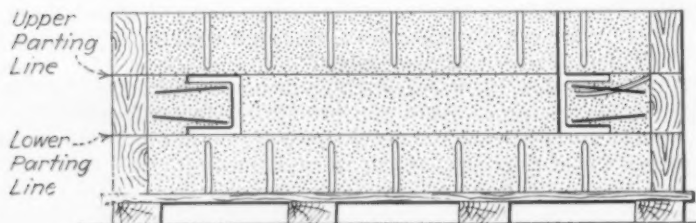


FIG. 2—Plan of three-part base mold showing (upper-view) rodding and venting details. Sectional view of closed mold underneath.



A recent tour through English Midlands and the manufacturing districts in the London area tends to confirm this impression, though it must be said, that, if more British jobbing foundries were air-lined than at present, their superintendents would be, in most cases, alive to the possibilities of cost reduction in this direction. Mass production everywhere on special lines of castings has been mechanized to an extent that leaves little room for comment, but the man who receives an order for one or two castings from a particular pattern, perhaps never to see the same job again, has certain peculiar problems which are sometimes discouraging, so that the desire to introduce mechanical methods, or to use those already available, must be suppressed.

There is, principally, the question of altering the customer's patterns and coreboxes in order to make them suitable for machine molding. When an order has been booked from the blueprint, that is to say, to include patterns, castings, and possibly machining operations, all that is necessary is a consultation between foundry and pattern shop as to what should be done in order to secure the best results at the lowest ultimate cost. But when the customer sends his own patterns to the foundry, designed so that it is only possible to mold them by hand unless they are altered to suit the foundry equipment, diplomacy is necessary if the alterations are suggested, or the enmity of the customer's patternmaker and probably of the buyer himself, may be easily incurred.

To be specific, Fig. 1 shows a triangular base of channel design, 3 ft. overall, of 1-in. section throughout, and weighing about 220 lb. A number of these castings were required, delivery to match that of accompanying parts

# Jobbing Foundry Practice

By J. H. EASTHAM

both in the form of rolled steel and other iron castings of various shapes. As the sketch shows, the lower flange of the pattern was made loose, and dowel pinned to the body at each corner of the triangle, a three parted arrangement, suitable for molding by hand in any foundry thus being formed.

When molded carefully, by the loose pattern single sheave pulley method, cheek part rammed up first, then the cope, the two clamped to the board and rolled over prior to making the second parting, ramming up and lifting off the drag, closing, rolling back again, and so forth, the item, regarded as a separate unit, lost money. Careful handling by a skilled craftsman was required, in order to avoid scrap, as the views of the partly made and finished molds at Fig. 2 make clear. The financial loss arose from the fact that the complicated piece was part of a contract for a heavy tonnage of miscellaneous castings, all at one price per pound. So for a time, the laissez-faire attitude of, "what we lose on the swings we gain on the roundabouts," carried; till a sudden change of supervision in the foundry brought about a corresponding change in methods.

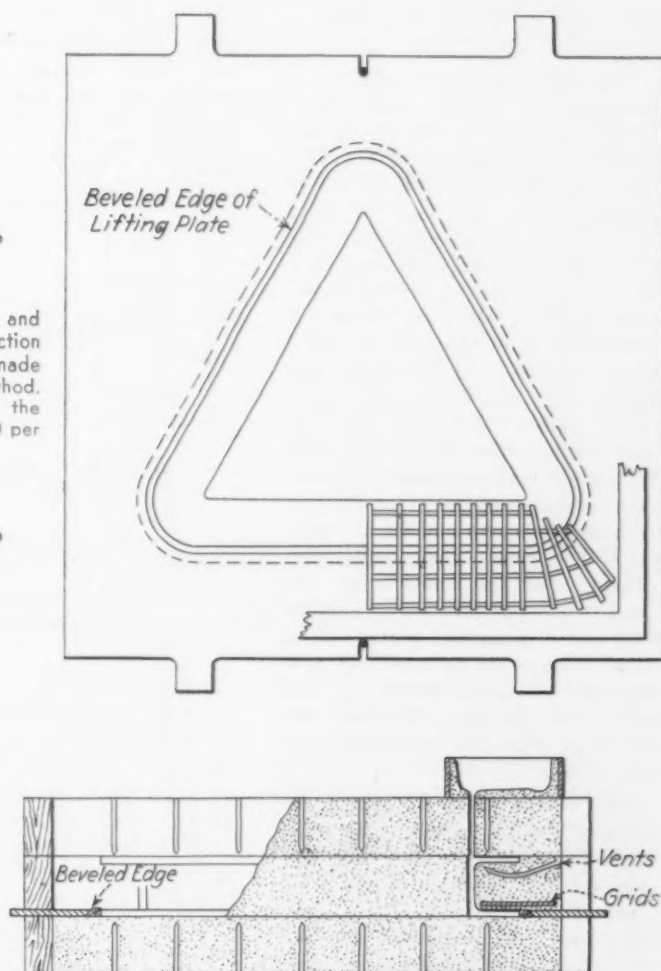
Instead of the system above described, lifting plates of a slightly larger area than that of the flasks used were molded without patterns, and cast open-sand, their central openings fitting around the base pattern in the form of a beveled edge at a distance of  $\frac{3}{8}$  in. from the flange. The drag section of the three part flask was first laid on the floor reasonably level, filled with sand, rammed lightly, and struck off. The lifting plate was then lowered to place, the slots provided at the ends fitting over the flask guide pins to insure accuracy when finally closing the mold, the plate being next tapped down to a close touch all over, so that, in the event

WITH the usual proportion of brilliant exceptions, opportunities for using the plain jolt molding machine are often overlooked in the general jobbing field, states Mr. Eastham. Cases are cited where use of this equipment resulted in definite lowering of costs.

of a light fin being formed on the casting's lower flange, no metal could flow under the plate.

The loose or lower flange of the pattern was now laid inside the open space in the plate, at an even distance from the feather edge, and the space between plate and flange tucked solidly full of facing sand, slicked off level, and a parting made. The main pattern being next set in place, the cheek part of the flask was lowered over the drag guide pins, resting on the lifting plate, and forming a fence round the mold. A thin layer of sand was then laid over the whole area, six sections of light cast iron grids, claywashed, and, when placed, forming a continuous grat-

FIG. 3 — Plan and composite section of base mold made by another method, which reduced the cost by some 40 per cent.





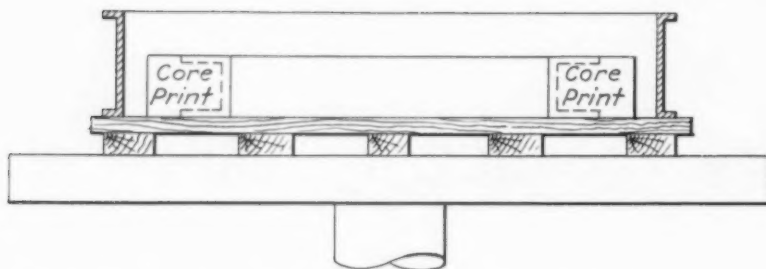


FIG. 4—Triangular base fitted for jolt machine. This method reduced the cost of production a further 200 per cent.

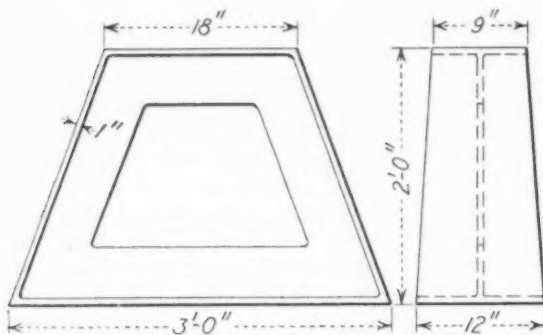


FIG. 5—Grinder stand pattern.

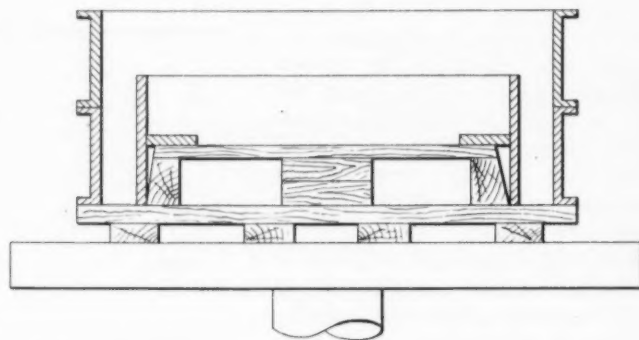


FIG. 6—Grinder stand pattern on packed up follow-board ready to jolt drag portion of mold.

ing all around the pattern, being next rubbed into the sand, their inner herringbone points close to the wall of the casting.

The entire channel shaped space between the upper and lower flanges, as well as the triangular opening in the center of the pattern, was next rammed up to the upper parting line, and the joint made, prior to ramming up the cope part with pop gates and riser in position. The cope removed, the pattern body, after the necessary preliminaries in the way of swabbing, venting, and loosening, was drawn out, the fillets and other small details finished, and the plate, with the complete cheek mold hoisted off and lowered on stools, at a height convenient for the underneath finishing and fillet rounding. The lower flange was then drawn, and the surface of the mold, wherever exposed to contact with metal, plumbago coated in the usual way, prior to assembly and pouring. General details of the mold made as just described are shown in plan and composite section at Fig. 3.

This simple and safe method of molding the job reduced the productive cost 40 per cent, took the item out of the red, and would have continued to the end of the contract, had the customer not requested quicker delivery, thus giv-

ing the foundryman an opportunity of showing, without giving offence, that the job could be speeded up considerably, if the pattern were rebuilt, fitted with prints, and the inside formed of dry sand cores, so that the molds could be made on a plain jolt machine.

Cheerfully agreed to, these

Noteworthy also in this method is the saving in brute labor on the man's part, all ramming by hand being abolished, several hours hard work on each unit being replaced by one minute's attention to a valve to regulate the number of jolts on cope and drag respectively.

In instances where alterations to pattern equipment are out of

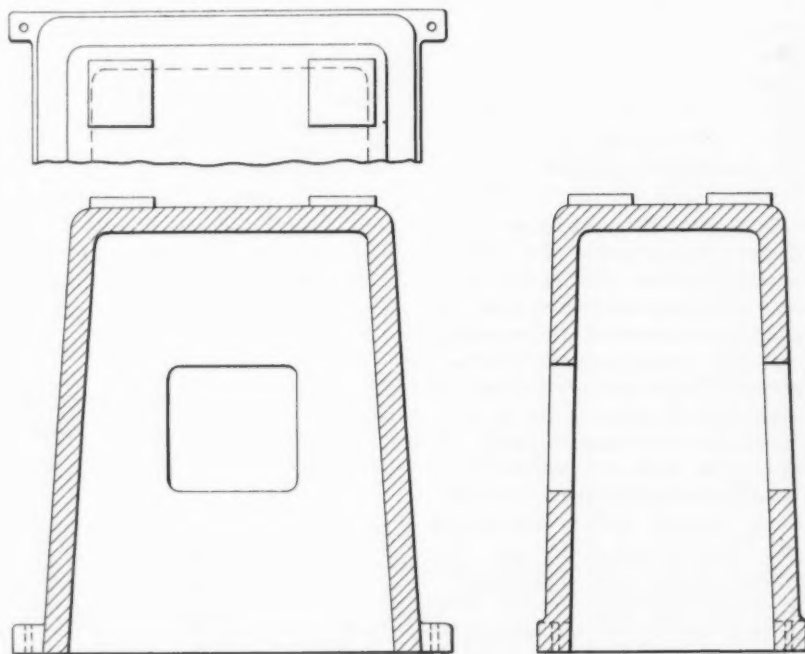


FIG. 7—Crusher base casting weighing 3200 lb.

the question, owing to design, or to refusal on the owner's part to permit a change, a partial use of the jolt machine can often be made profitable, as in the example provided by the grinder stand shown at Fig. 5. Weighing only 375 lb. the casting, made infrequently in orders of two at a time, costs, when rammed by hand, a sum of money uncomfortably close to the maximum estimated allowance, leaving no margin to cover a possible scrap casting. Mounted as shown on the machine table in Fig. 6, the drag carefully jolted to green sand mold hardness, well vented, hoisted to the floor and rolled over in the usual way, the cope then rammed up on the joint by hand, a saving of  $\frac{1}{2}$  hr. was effected on the drag molding operations, one minute's jolting being substituted for the time formerly spent in hand ramming—a welcome reduction in cost on 375 lb. of casting.

Heavy dry sand molding furnishes many opportunities of using plain jolt machines, as the fear of ramming the mold unduly hard, with the risk of consequent scabbing, need not exist, but, in this direction, the larger steel foundries appear to be leading the way, those combining a jobbing business with a line of railroad castings being particularly well equipped in many cases.

#### Jolt Machines at Hand, But Not Used

The man, who, having been given the last word in machines and their accessories in the way of flask equipment, makes no effort to turn them into tangible assets, is visible here and there, his tenure of office being generally brief. In a very large Eastern plant handling a wide range of work, including frequent castings weighing over 100 tons each, a side bay of the foundry was occupied by the coremaking, loam molding, and the smaller castings required in dry sand and green sand from about 300 lb. to 12 tons each. With the idea of simplifying production, particularly on the dry sand end of the business, the company installed two plain jolt machines, the larger table of the two being 6 ft. square, with a lifting capacity of about 10 tons.

The flask equipment left nothing to be desired, consisting as it did of massive cast boxes, some round, others square, with di-

ameters in easy stages from 24 to 100 in. Mostly made in 12-in. depths, any desired height was possible. Two cranes of 30-ton capacity each, and one of 20 tons spanned the bay, and the excellent situation was further improved by the fact that the pattern shop superintendent was willing and anxious to cooperate with the foundry at all times.

When the workmen in the bay were asked why the machines were not in use, they answered that the larger unit was broken down, and, "we never use the small one."

The foreman, when information was sought from him, replied: "They say the big one is broken down, but I have never looked." And as to the small one: "Oh, we never bother about it." For these

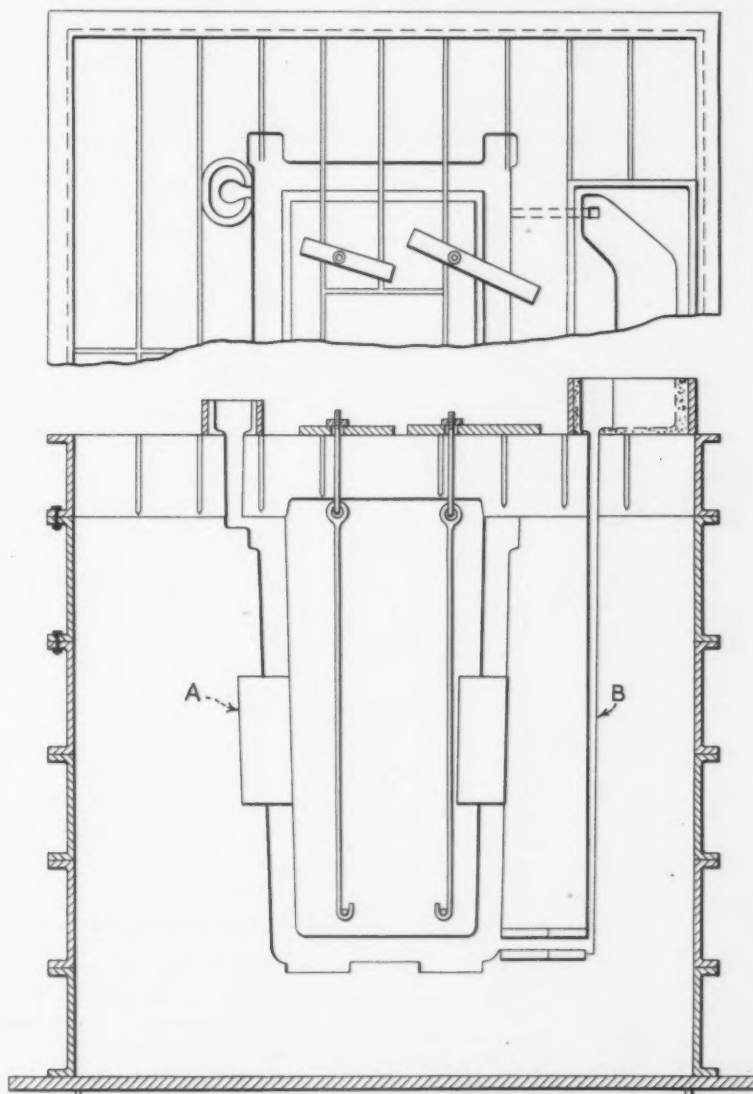


FIG. 8—Composite view of crusher base mold, showing, at A, pattern as originally made, and, at B, straight-sided to suit jolt machine after changing.

So, when an addition to the staff was made to relieve what the company felt to be an unsatisfactory condition, the new man, looking things over, saw an enormous pile of empty flasks in diminishing sizes, stacked up on the 6 ft. machine table, just like the final resting place of the late esteemed Mr. Cheops. Visualizing the neighboring Ohio River as the Nile, the illusion became almost perfect.

excellent reasons a \$12,000 investment had become flask storage, and the smaller machine was invisible because of the patterns piled on and around it every day. Investigation showed both machines to be in first class condition, needing cleaning and oiling before becoming tangible assets.

Following the foreman's abrupt exit, and one of the many jobs (CONCLUDED ON PAGE 75)

# How Attractive Finish Helps

BY HORACE R. WHITTIER AND HERBERT R. SIMONDS



THE fusing of enamel on metal is an old art which has come down to us through the centuries. Long associated with ornaments and the decorative arts, its utilitarian value is just becoming understood. As a coating for steel, porcelain enamel has many unique and valuable properties. Perhaps chief of these is the fact that a fused coating of glass-like enamel will completely and enduringly protect the underlying steel against the corrosive effects of the weather.

An engineer will sometimes design an article and specify a finish that is entirely inadequate, not giving a thought to the readily available porcelain enamel finish which is suitable not only for kitchen utensils, stoves, refrigerators, sinks, building material for houses, and numerous other applications, but is equally well adapted for use on other items such as dials for clocks and for gas meters, textile guides, insulated screw eyes for holding electrical wire, sun dials, oven thermometers, other thermometers subjected to corrosion and exposure, small advertising signs, badges and automobile emblems. Many engineers continue to specify instrument dials which deteriorate quickly in use. Most everyone is familiar with the dingy appearance of some of the dials found in factories and shops today, few of

SMALL metal parts such as watch and clock faces, instrument dials and electric switch parts may be efficiently finished in porcelain enamel on a production basis. The present article describes, among other things, some of the practical finishing methods of the Horace R. Whittier Co., of which Mr. Horace R. Whittier is vice-president. This series on metal finishing is being prepared under the direction of Herbert R. Simonds.

which have the contrasting colors obtainable with jet black figures on a gleaming white porcelain enameled dial.

The Horace R. Whittier Co. for 10 years has specialized in the porcelain enameling of small dials and parts, and the following practical considerations are based on this company's experience. A recent job was the finishing of dials for a timer for a clock company to enable the company to dispense with the glass disk which usually protects the ordinary dial. Porcelain, due to its nature, can be readily cleaned and it naturally works in advantageously in instances such as this.

Small dials and parts, some of which are as small as 1 in. in di-

ameter, are produced in volume and handled effectively through the enameling sequence. Until a few years ago this work was done in small furnaces using clay flanges and the largest production would probably be 18 or 20 at a time, involving a cycle in the furnace of possibly 5 or 6 min. Now the Whittier company has developed its own furnaces which are of substantial size so that the flanges take up to 200 pieces each, with two flanges in each furnace.

## Furnace Design

The furnaces are made with two doors—one at each end, the work being introduced in one end and removed at the other. This means that each flange rests for a time near the entrance door and then is moved back to make way for another entering flange. This is important because the changing position brings first one side of the flange toward the center of the furnace and then the other, and thus offsets any unevenness in temperature in the furnace. The time required for putting these dials through the furnace is 3 to 4½ min., depending upon the type of enameling.

In the enameling of iron, more or less established customs are followed. First blue grip coat enamel is used, having a coefficient of expansion which enables it to adhere to the iron. Then the subsequent coats are the color coats, usually



## 33—Porcelain Enameling of Small Parts

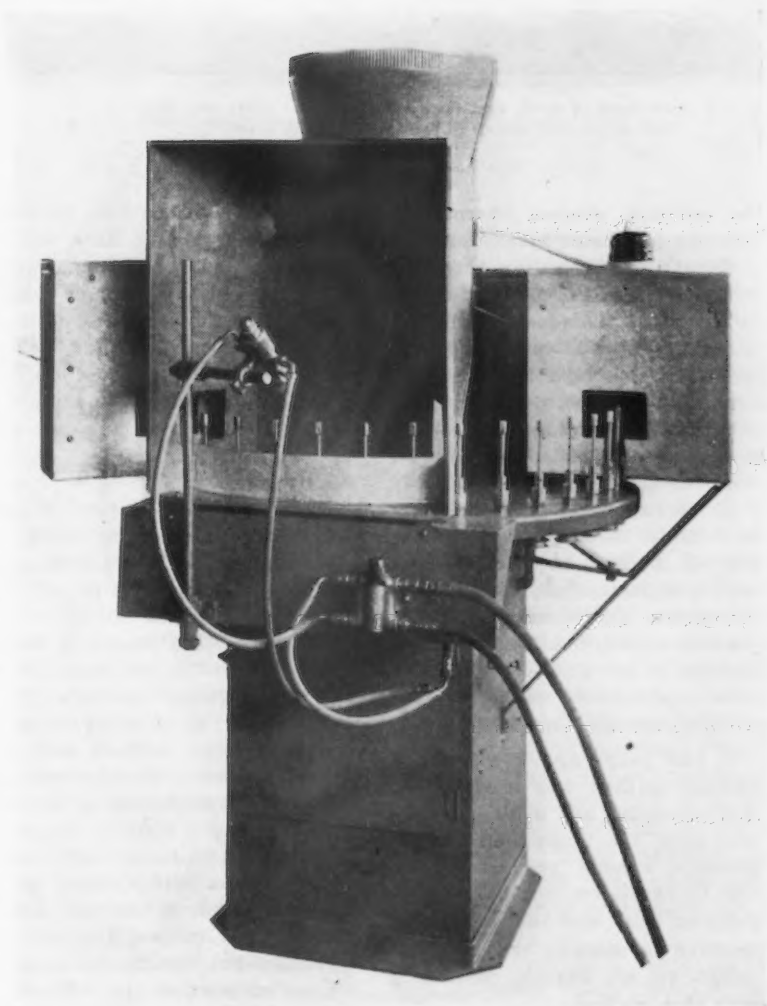
white, but in many instances colors to meet the specifications of the job going through. Pleasing colors in porcelain enamel are the pastel shades and they are mostly preferred by the manufacturers of stoves, refrigerators, and similar articles. The Whittier company finds that these pastel shades go well with the smaller items.

The dials intended for use on meters are frequently enameled on copper to enable the manufacturers of meters to solder them to their meter movements. Dials of this character may cost a few cents more than the unenameled dials but often these few cents may be the means of preserving the usefulness of a meter costing \$15 or more.

### Method of Decorating

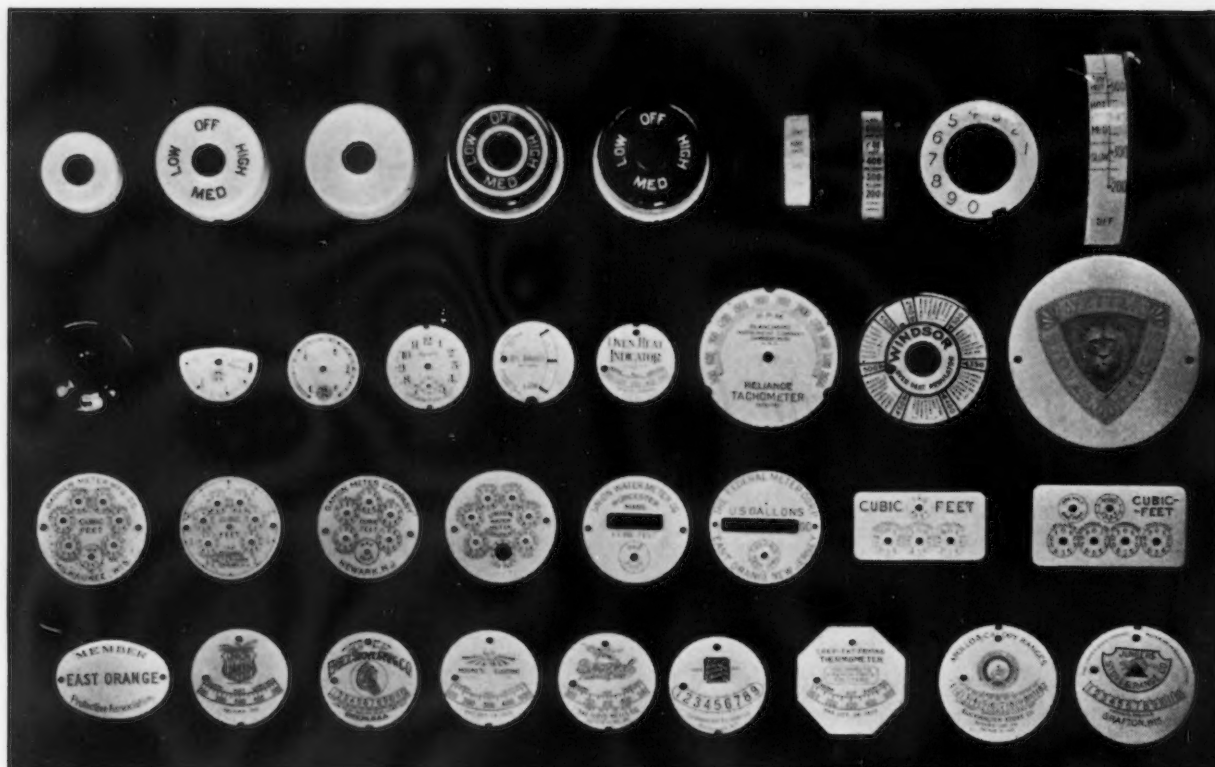
One of the problems in developing inexpensive and yet decorative dials with porcelain enameled finish was to find a suitable method of printing. On a glassy surface it is not feasible to print, as on a printing press, direct. Instead, indirect or offset methods as in lithography are employed. The decoration or ink is nothing more than enamel of a concentrated type known as oxides. In the firing such ink is fused right into the enamel. Therefore one may realize that such a dial will endure under all weather conditions.

For the first coats, known as grip coat enamels, the base metal must be carefully prepared and



Courtesy, The DeVilbiss Co.

**S**MALL parts such as watch faces frequently are coated with enamel on a semi-automatic machine of this character. The individual spindles revolve as they pass the spray station, and after being coated pass on through a preliminary drying box.



THIS assortment of small vitreous enameled metal parts was selected from the varied output of the Horace R. Whittier Co.     ○   ○   ○

the surface cleaned thoroughly, not only to remove grease but also scale. In the Whittier shop the spraying method is used for covering the metal. This method employs spray guns with atomizers that are adjusted for relatively high pressures and are operated by experienced men knowing the exact thickness required. The dip method is used for some jobs, but generally it is not exact enough to meet requirements. Many jobs require additional firings as a thick coat cannot be successfully fused in one operation. Sometimes two grip coats are used, but the commoner practice is one grip coat and two color coats, each successive coat being separately fused.

A few years ago a continuous furnace method was used at the Whittier plant, and while in operation gave the impression of tremendous volume production, but due to excessive cost of replacement of belts and the extra heat required for heating the belts, the results did not warrant continuing with that method.

Today the superintendent says: "We can get as much production with a more simple method, using large-sized flanges that are wheeled

up to the furnace door on rubber tire carriages. We have our own designed fork for picking these up and the carriage can be wheeled around to the opposite side to receive the flange emerging from the other side, giving a cycle of production about equal to that of an automatic process.

#### Hand Printing

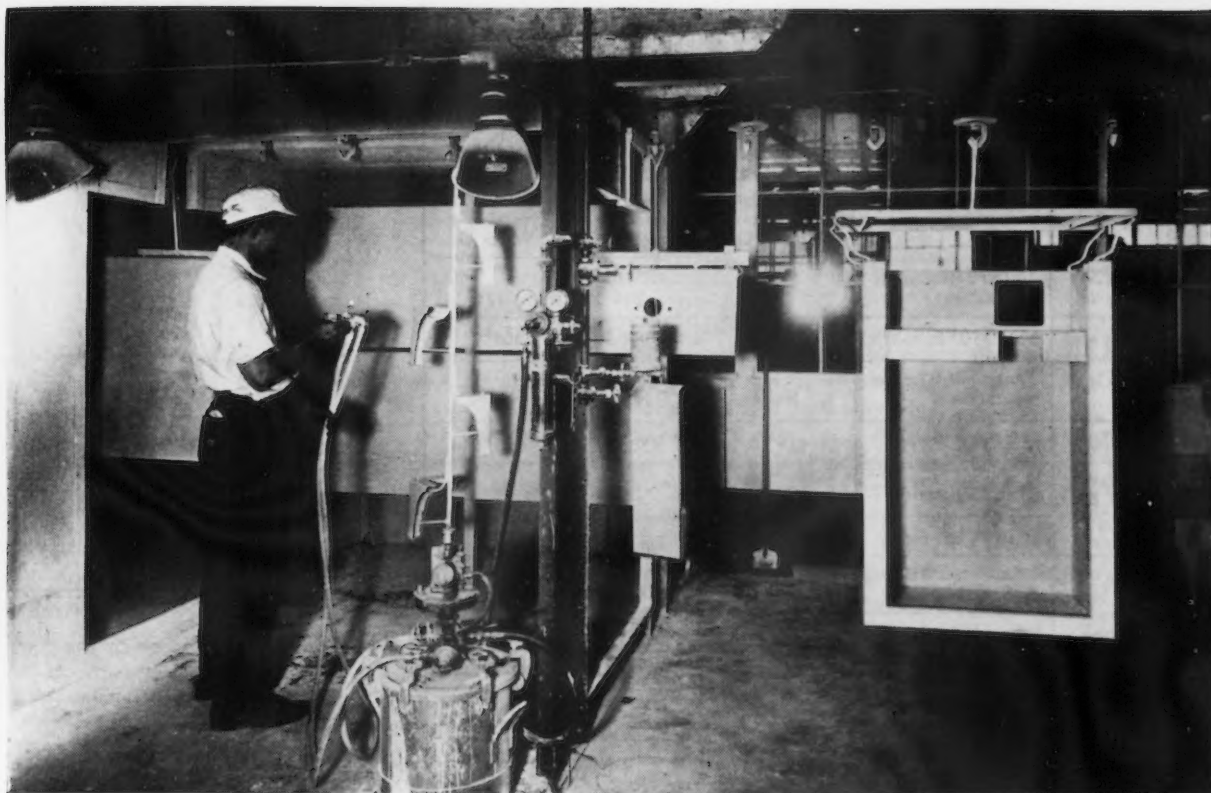
"In printing we use the hand method, one operator doing approximately 1500 to 1800 pieces per day. The presses are all hand operated and the inking is also done by hand, giving us a fineness in workmanship that cannot be had by mechanical methods. True craftsmanship, in many instances, requires hand methods and until the time comes when we are convinced that mechanical means have been developed whereby we can get the same results, we feel it much better to continue with our present method than to depend upon a mechanized method that will not produce the quality we now get. Even at present the cost of our printing does not average more than  $\frac{1}{2}$ c. to  $\frac{3}{4}$ c. per item.

"For large printing we feel confident that lithography, or possibly the screen process, as on poster

work, could be employed. However, we have not specialized in this larger work. When we do have a larger sign we employ the stencil method, well known in the manufacture of porcelain enamel signs, that requires the use of double stencils and stiff brushes that brush the background of the letters, leaving the letters under the stencil."

#### Technique of Coating

Practice in respect to application and baking of porcelain enamel differs considerably among manufacturers. Most of the processes and much of the equipment are in line with practice in non-vitreous enameling and lacquering, which practice has been described in previous articles in this series. Some of the technical considerations in mixing and applying vitreous enamel are discussed in an article called "Production Problems in Enameling Iron and Steel" by Leroy W. Allison and Malcolm B. Catlin in *THE IRON AGE* Oct. 4, 1934. The experiences of some other manufacturers, particularly as they apply to the porcelain enameling of small parts, may be interesting to include at this point. Herbert Turk, of the Porcelain Enamel



LARGER parts are usually coated in spray booths. This shows the use of an overhead trolley carrying a miscellaneous assortment of metal parts past the sprayer.

& Mfg. Co., Baltimore, in describing his company's processes in applying porcelain enamel, states: "The metal base is heated to a temperature varying from 1250 to 1650 deg. F., depending upon the nature of the material and other considerations. This heat has the effect of opening the pores of the metal so that when the enamel mixture is applied it enters the pores to create an inseparable bond. The contracting of the metal during cooling has the effect of keying the enamel in place."

Assuming that the enamel batch has been prepared by the mixture of frit, clay, water and other additions, the process then reduces to three main operations: (1) cleaning the base metal, (2) applying the coating, (3) drying and baking. Under the first heading the cleaning follows well established pickling procedure. Glenn A. Hutt has described the practical cleaning operation of a porcelain enamel shop as follows:

1—Immerse in solution of trisodium phosphate, rosin, soda ash, and sodium hydroxide held for 10 min. at a temperature of 200 deg. F.

2—Rinse in warm water held at 150 deg. F. for 2 min.

3—Immerse in an acid solution consisting of 8 per cent sulphuric acid held at 150 deg. F. for 8 to 12 min.

4—Rinse again as before

5—Neutralize in a solution of 90 parts soda ash and 10 parts borax for 4 min.

6—Dry at about 300 deg. F. for about 5 min.

Then a coating is applied as soon after this final drying as possible. This is done usually with an air spray, although larger pieces are frequently dipped.

#### Machine Coating

One of the equipment manufacturers describes the automatic spraying of watch dials. Here the parts are mounted on spindles carried by a rotating table in such a way that each part revolves on its own axis as the table carries it past the spray station. The table revolves continuously but the motion of the individual spindles stops at the loading station. As the parts on their revolving spindles reach the coating station an automatic control switch causes the air spray to start and then to stop, so as to apply just the right amount of enamel.

In one design of machine the air spray is mounted on an oscillating device which permits it to travel

with the work, thus keeping the spray on the center of the revolving dial while it is being coated. This is said to give better finish and to reduce to a minimum the amount of enamel used. For small runs or job work the hand spray operated in a spray booth is general practice. Sometimes this hand method in combination with a traveling belt or even with a revolving rack is used to speed up the work.

In speaking of methods of spraying the DeVilbiss Co. says: "There are two basic designs employed in coating machines. One involves taking the spray guns to the work, and the other, taking the work to the spray guns. The former is the simpler and by far more widely used. For large flat objects traveling on a conveyor the guns are usually mounted over the work and arranged to move automatically across the work in the same manner as an operator would use a hand spray gun."

Baking usually follows immediately after spray coating, although in some cases a drying operation is used. The baking of small parts in most cases follows closely the practice of the Whittier

(CONCLUDED ON PAGE 69)



# UNION SPECIAL MACHINE COMPANY LUBRICATING OIL SPECIFICATIONS

Standard Test For	Specification Requirements	Specification No. 83	Specification No. 82	Specification No. 86
		Tests of a Typical Straight Mineral Oil	Tests of a Typical Compounded Oil	Tests of a Typical Water White Oil
Viscosity (Sayboldt Universal)	200 to 250 seconds @ 100° F.	210	237	225
Flash Point and check for Separation of Fixed Oils	Min. 350° F. There must be no separation	405° F. None	390° F. None	405° F. None
Burning Point	Min. 375° F.	425° F.	450° F.	415° F.
Specific Gravity Spec. 83 & 82	23 to 28 Baume	25.9	25.	
Spec. 86	30 to 34 Baume			30
Color Spec. 83-82	1.5 to 3 N.P.A. or A. S. T. M.	2.5	2.25	
Color Spec. 86	Water White			Water White
Free or uncombined Hydrocarbons	U.S. Bureau of Stds. Discoloration Nil in Water White Oils	Black	Black	Water White
Corrosion Test	No discoloration of a copper strip submerged in oil 3 hours @ 212° F.	None	None	None
Neutralization Number	Maximum of .10	.09	.07	.03
Carbon Residue	Conradson Method Maximum of .12	.10	.085	.05
Compounded Oils i.e. % Fixed Oils	Max. 5% A.P.I. or A.S.T.M. Method	None	3.0	None
Base or Crude	Naphthenic or Paraffine	Naph.	Naph.	Naph.

Oils complying with our Specification No. 83 are recommended for use where oil stains on a garment are not of importance.

Specification No. 82 should be recommended where the garments are washed. The presence of 5% or less animal or vegetable oil aids saponification.

Specification No. 86 should be recommended where it is essential that garments must not show oil stains even after a considerable storage period.

SPECIFICATIONS were issued covering straight mineral oil, compounded oil and water white oil.



PROBLEMS of lubrication vary in degree, but probably not in ultimate importance throughout the metal-working industry. A manufacturer buys a machine and expects from it not only the work of a quality for which it was purchased but he also expects a return on his investment which is tied to the life of the machine. Likewise, he makes a mechanized product, knowing the requirements of his customers and knowing that his customers, like himself, want an adequate return on their invest-

ments. These requirements are directly affected by lubrication.

The Union Special Machine Co., Chicago, manufacturer of commercial sewing machines, presents possibly a special case in the matter of machine lubrication, but its general method of solution of the problem charts the way for many manufacturers, not only as regards their own plant operations but also as pertaining to their products in use and hence the satisfaction of their customers.

It is pertinent at this point to discuss briefly the specific problems faced by this company. In the first

# Lubrication

By Rogers A. Fiske

Western Editor, The Iron Age

THE manufacturer of mechanized products has a double lubrication problem. One has to do with operations within his own plant and is easily controlled. The second, and more difficult one, is concerned with the correct lubrication of his product in the customer's plant. In this article, the author tells how a company manufacturing high speed precision machines has built more satisfactory usage of its products through customer guidance with respect to lubrication.

place, it manufactures strictly in the precision field. Lubrication of moving parts in its products has become increasingly important in recent years as buyers of its machines have incessantly demanded higher speeds. Only a few years ago a sewing machine that operated at speeds from 2500 to 3000 r.p.m. was considered fast. Then came the drop in the work week from 40 hrs. to 36 hrs. and machine speeds went up to 5000 r.p.m. Now there is talk of a 30-hr. week and more talk of still higher speeds for the machines. An idea of the importance of precision and lubrication can be derived by considering that a 5000-r.p.m. machine has oscillating and reciprocating parts that reverse 10,000 times a minute. In ten hours of operation these

# on Guidance Helps to Hold Customers

parts will reverse 6,000,000 times. Quality performance under such conditions necessitates quality in manufacturing methods and equipment and cooperation with the buyer of sewing machine equipment so that he will get the service which he can reasonably expect.

For many years this company has been buying the best of ma-

chine tools and shop equipment. Special care has always been taken to keep shop tools in such condition that permitted tolerances could be maintained. This close attention to detail led to a study of the practices of lubricating the shop equipment.

One of the first things disclosed was that something more nearly of

an automatic character was needed if excessive machine wear was to be avoided. Accordingly, ordinary oil cups were removed from the machine tools and in most instances sight lubricators were substituted. In any event, wherever a change was deemed advisable a lubricator of the reservoir type was installed, thereby assuring a steady and uni-

## RECOMMENDED OILS FOR UNION SPECIAL SEWING MACHINES

Specification 83 is a straight mineral oil " 82 is a compounded oil " 86 is a water white oil				Code "F" equals first choice " "S" equals second choice " "T" equals third choice																	
NAME OF OIL COMPANY Producer or Distributor	BRAND OR TRADE NAME	Oil Spec. No.			Code			BRANCH SALES TERRITORY NAME OR NUMBER													
		83	82	86	F	S	T	Bos.	N. Y.	Phila.	Atla.	Cintl.	St. L.	Chgo.	Can.	P. C.	Paris	Brs.	Lel.	Copen.	Stutt.
Advanced Oil Works, Inc. Alonso K. Lynch Brooklyn, N. Y.	Purity Lub. Oil			V	V																
	Advance No. 18		V						V												
Associated Oil Co., San Francisco, Calif.	Cyclo Med. Dynamo Oil		V		V											V					
Colonial Beacon Oil Co., Boston, Mass.	Colonial "T" DC Oil	V			V			V													
Continental Oil Co.	Conoco Circol Med.	V				V			V	V			V	V		V					
	Conco Germ Pro. Cir. Med.	V	V		V				V	V			V	V		V					
Dearborn Chemical Co.	Fort Howe "XX"	V			V									V							
E. F. Houghton Co., Phila., Pa., and all large cities of the world.	Union Special Oils		V			V		V	V	V	V	V	V	V	V	V	V	V	V	V	V
			V			V		V	V	V	V	V	V	V	V	V	V	V	V	V	V
McCall Frontenac, Toronto, Canada	Vesta Red	V				V															
	Marathon Turbine Oil	V				V									V						
Puro Oil Co.	Puroco Medium	V			V				V	V		V		V							
	Purosol		V			V			V	V		V		V							
Shell Petroleum Corp. U. S. A.	Shell Albus No. 3143	V			V			V	V	V	V	V	V	V		V					
Shell Oil Co., Canada, Ltd.	Shell Ec. Pale Oil	V			V										V						
Shell Oil Co., Rest of World	Shell B. D. I. Oil	V			V												V	V	V	V	V
Standard Oil Co. of California	Calol Special	V			V											V					
	Calol Special Wool Oil		V				V									V					
	Ovonite Live Stock Oil		V			V										V					
Standard Oil Co., Dist. of Col.	Standard Turbine Oil Med.	V			V						V										
	H. V. White Oil			V		V					V										
Standard Oil Co. of Ind.	Stanolind Turb. Oil Med.	V					V							V							
	Junior Rad Eng. Oil	V					V							V							
	Light Polarine		V				V							V							
	Merusol			V	V									V							
	Superla Stein's Tex. Oil, Mvy.			V	V		V							V							
Standard Oil Co. of Kentucky	Kyso Turb. Oil, Med.	V				V						V									
	Merusol			V	V								V								
Standard Oil Co. of Ohio	Stanolind Turb. Med. Oil	V					V						V								
	Polarine Light		V				V						V								
	No. 871 Mineral Oil			V	V								V								
Standard Oil Co. of Pa.	Stanolind Turb. Oil Med	V					V				V		V								
	H. V. White Oil			V	V						V		V								
Standard Oil Co. of N. J.	Standard Turbine Oil Med.	V					V			V	V										
	H. V. White Oil			V	V					V	V										
Texas Oil Co.	Cetus	V				V							V	V		V					
	No. 503 Oil	V					V						V	V		V					
Vacuum Oil Co.	Arctic "C" Heavy	V					V		V	V	V	V	V	V	V	V	V	V	V	V	V
	Etna Medium	V					V		V	V	V	V	V	V	V	V	V	V	V	V	V
	P-962	V						V	V	V	V	V	V	V	V	V	V	V	V	V	V
	Vactra Light "X" Mixed 50-50 with Vactra Heavy Medium "X"		V				V		V	V	V	V	V	V	V	V	V	V	V	V	V
	S-1019			V	V				V	V	V	V	V	V	V	V	V	V	V	V	V
Viscosity Oil Co.	V. Dynamo Oil Med	V				V							V								
O. F. Zurn Oil Co. (Phil., Pa.)	Machine Oil 200-250	V					V				V										
	Water White 200-250			V	V																

CHART showing recommended oils and where they can be purchased.

form supply of oil throughout the full working period of the machine.

A close check on the machines disclosed points of wear to which no special attention had previously been given. In cases of this kind special fittings were applied and a steady supply of oil was assured to those points. The outcome of this study is that now when the Union Special Machine Co. buys a new piece of shop equipment it pays particular attention to the manufacturer's plan and ideas of lubrication, and before that machine is ordered the builder has agreed to comply with the recommendations of the buyer. This is one of the important means by which desired tolerances are maintained.

Incidentally, this is valuable co-operation insofar as the plant equipment builder is concerned. It is something that he should welcome, and, in fact, seek. It so happens that the engineers in this plant have made valuable suggestions for curtains, wipers and lubricators for protecting the ways and gibs on numerous machine tools.

#### Servicing Lubrication in the Plant

The study of how to apply the lubricant necessitated selection of the right lubricants and a plan for servicing the plant equipment. Accordingly, a light buggy was constructed with a tray for containers of the various oils needed. A service man moves this buggy from machine to machine, thereby assuring that all oil cups are kept filled with the proper lubricant. Thus responsibility is removed from the operator who can give all of his attention to the specific work at hand.

When the engineers turned their attention to their own products they had an entirely different set of problems. They designed an efficient lubricating system that would care for speeds of 5000 r.p.m. and the machines could be sent out of the shop in proper condition to operate to the satisfaction of the buyer, but the company could not control the grade of lubricant that would be used thereafter. Sometimes it was a matter of the buyer using an expensive oil, but one not suited to the requirements. At other times, cheap and unsuitable oils were used. These sewing machines are sent to all parts of the world and often a lubricant was used which was an off-

hand guess by a local oil company, when in all probability a suitable grade of oil was somewhere within reach.

One phase of the problem was the matter of education, which, on first thought, seemed like a real stumbling block. However, as it turned out, the service was so appreciated that practically no effort was required to put it over.

#### Oil Products Studied and Charted

As was to be expected, the first problem was to determine the correct type of lubricant and then write its specifications. It is somewhat astonishing that an oil company approached on the problem refused to take time to carefully study the machine, but instead had one of its "experts" make a guess that turned out to be wrong. Perhaps there was little commercial inducement in a proposition wherein oil consumption by individuals was so small and the market so widely scattered. It seemed on the face of things that no oil company could afford to make the study and survey and then develop the market on a real commercial basis.

This state of affairs forced the Union Special Machine Co. to set up its own laboratory and to start an independent investigation for the determination of the lubricants it needed. These were found and specifications were drawn which were matched and noted against standard commercial grades of lubricants made by some of the oil companies. Some of these companies are more or less local in character, while others do business all over the world. A chart was drawn showing the name of the oil company, its suitable brands or trade names, the numbers of the specifications, a code to signify first, second and third choice, and a list of the principal cities of the world which were checked to indicate that oils are in stock at those points. Therefore, a machine operator in Paris can refer to the chart and quickly determine what oils of suitable specifications can

be had in his city. An interesting point is that soon after this chart was distributed there was a general clamor from numerous oil companies wanting their names and products listed thereon.

A copy of the specifications and simple educational instructions accompany the chart. These instructions are as follows:

"The viscosity of an otherwise suitable oil is its most essential physical property. Viscosity denotes the body of an oil, its relative resistance to flow. A starved bearing is the inevitable result of using a lubricant which is either too light or too heavy-bodied for the bearing clearances, methods of lubrication, and operating speed of the unit. Any oil employed to lubricate Union Specials must be, therefore, within our specification requirements, namely, test between 200 and 250 sec. at 100 deg. F. using a Saybolt Universal Viscosimeter or its equivalent.

"The flash and burning points of an oil indicate its stability. A heavy lubricant, thinned with, say, kerosene would be detected by these tests. Similarly, an improperly compounded oil will show separation during the heating period while making these tests. Such an oil would decompose in service and deposit residue in bearings and on sewed products.

"The specific gravity of an oil indicates its relative weight in comparison with an equal volume of water. As an indicator of quality, it may be stated that oils having a Baume gravity higher than our specifications, denote the presence of lighter-bodied oil, not a desirable characteristic. (See flash and burning comments above.) However, paraffine base oils, such as Pennsylvania crude, have a somewhat lower specific gravity or higher reading on the Baume scale than naphthenic base oils, but a higher flash and burning point for the same viscosity.

"The color test is specified to insure an oil free from excess impurities in the form of hydrocarbons or suspended matter.

"The corrosion test is an effective method of determining the presence of free acids or alkalis. Only a poorly refined oil has them. Their presence results in the corrosion and pitting of bearing surfaces. Compounded oils tend to

(CONTINUED ON PAGE 75)





# Brittleness in Steel

BY CARL L. SHAPIRO, Sc.D.

Research Associate, Harvard University



IN the two previous sections of this three-part review of steel brittleness, Dr. Shapiro correlated the results of many investigations on blue brittleness, transformation shortness, and secondary and carbide brittleness. This concluding part of the dissertation continues the discussion of blue brittleness which was started in

the issue of Feb. 28. Also the pseudo blue heat range of stainless 18-8 steels is defined and described.

A number of steels in various heat treated conditions were tested as to brittleness by a determination of strength (breaking weight) and ductility (angle of twist). The method of making these tests was described in THE IRON AGE of Feb. 21.

All torsional results secured by these tests are combined herein in a series of three dimension diagrams, which have a great many advantages over the ordinary vertical-horizontal (ordinate - abscissa) type of curve. Some of these advantages are: (a) Ductility and strength can be read directly from the diagram at any temperature desired, (b) the physical properties of the material at any temperature between the experimental tests can be readily computed with a fairly safe degree of accuracy by extrapolation, (c) the various types of brittleness are illustrated very readily, and (d) the number of diagrams of the ordinate-abscissa type, which reveal the same facts are reduced, e.g., ductility - strength, ductility-temperature and strength-temperature, as they are all shown in one three dimensional diagram. A diagram of a hypo-eutectoid steel is shown in Fig. 15.

The results obtained on a series of normalized hypo-eutectoid and hyper-eutectoid steels are shown in Tables V and VI. The strength of the steels increases with the carbon content. The maximum breaking

weight is at 300 deg. C. in all types of normalized carbon steel. However, the ductility decreases with the carbon content and indicates that the blue heat range is at 300 deg. in the hypo and eutectoid steels and a little lower in the hyper-eutectoid steel. Secondary brittleness is recorded in the hyper and eutectoid steels, but it is not observed in the lower carbon steel. This may be accounted for by the

TABLE V  
Breaking Weights of Normalized Steels

Temperature in Deg. C.	0.36 C	0.82 C	1.23 C
25	48.4	59.4	68.1
100	45.9	58.3	66.1
200	47.3	55.5	65.4
300	47.5	61.6	78.2
400	40.2	60.6	60.0
500	27.4	28.6	35.6
600	16.1	16.5	22.6
675	10.6	11.3	10.5
700		5.0	6.6

TABLE VI  
Angle of Twist for Normalized Steels

Temperature in Deg. C.	0.36 C	0.82 C	1.23 C
25	1.28	0.51	0.26
100	1.23	0.62	0.32
200	1.08	0.45	0.28
300	0.40	0.44	0.44
400	1.31	1.50	0.79
500	2.96	2.44	0.74
600	3.89	3.00	0.57
675	4.00	2.15	0.89
700		4.75	1.27

TABLE VII  
Breaking Weight for 0.36 Carbon Steel in Various Heat-Treated Conditions

Temperature in Deg. C.	Pearlitic	Normal- ized	Sor- Quenched	Oil bitic
25	43.6	48.4	72.7	56.2
100	38.0	45.9	84.0	51.8
200	38.0	47.3	90.6	54.0
300	42.9	47.5	95.4	57.9
400	44.5	40.2	55.3	43.7
500	28.4	27.4	33.0	27.9
600	16.1	16.1	17.0	17.2
700	7.4	10.6	8.0	9.6

TABLE VIII  
Angle of Twist for 0.36 Carbon Steel in Various Heat-Treated Conditions

Temperature in Deg. C.	Pearlitic	Normal- ized	Oil Quenched	Sor- bitic
25	0.60	1.28	0.07	1.90
100	0.60	1.23	0.08	1.39
200	0.42	1.08	0.06	1.34
300	0.21	0.40	0.32	0.39
400	0.62	1.31	1.56	1.16
500	2.20	2.96	2.75	2.35
600	2.70	3.89	3.10	3.00
700	6.00	4.00	5.75	4.33

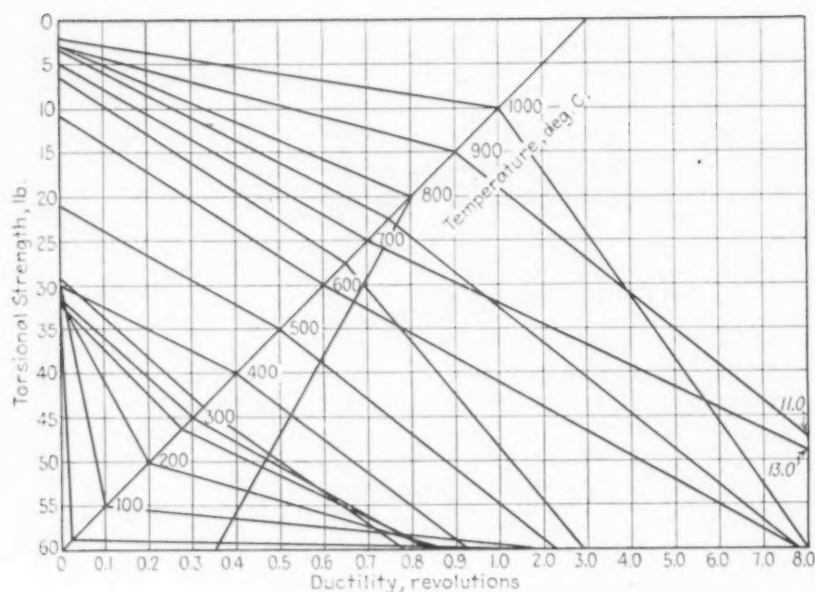


FIG. 15—Torsional results obtained with an annealed 0.12 carbon steel. The use of this three-dimensional system permits of much more elaborate and easily read data, as compared with conventional cartesian coordinates.

TABLE IX  
Breaking Weight for 0.87 Carbon Steel in Various Heat-Treated Conditions

Temperature in Deg. C.	Pearlitic	Normalized	Spheroidized	Water Quenched	Oil Quenched
R. T.	45.0	56.8	46.8	13.8	61.7
50	39.0	46.0	44.8	22.3	72.9
100	42.0	56.7	44.9	13.0	38.8
150	44.3	59.6	48.0	34.1	61.6
200	40.2	60.0	43.6	52.3	119.0
250	37.2	59.7	43.1	66.7	124.9
300	35.2	83.0	47.2	90.7	58.0
400	46.5	70.6	55.0	84.7	55.0
500	40.4	51.4	25.1	59.2	37.0
600	30.0	31.8	14.9	20.1	...
700	21.0	20.6	7.3	...	...

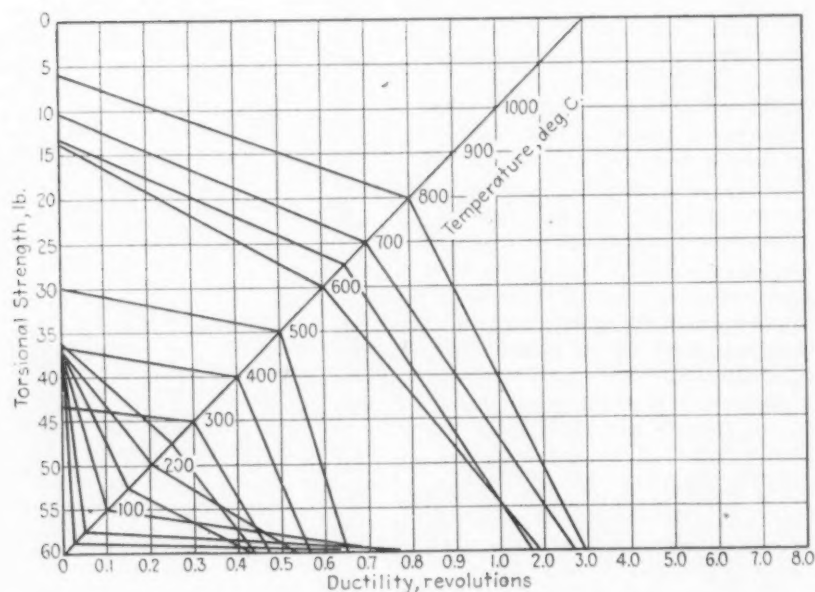


FIG. 16—Torsion data for 0.30 carbon cast steel in the "as received" condition. Breaking weight reaches a minimum at 150 deg. C.

large temperature interval between tests.

As space is limited, a comparison of a series of hypo-eutectoid and hyper-eutectoid steels in various heat treated conditions will be presented in the following tables.

In Table VII (36 C.) the breaking weight decreases with the temperature until it reaches its minimum strength at 100 deg. C., in the normalized and pearlitic steels, while it is at 25 deg. C. in the sorbitic steels, and at 400 deg. C. in the pearlitic series. Above these temperatures the breaking weight diminishes.

The ductility of the steels in Table VIII decreases slightly above room temperature, except in the oil quenched series where the conversion of martensite to troostite and sorbite interferes with the normal process of slip. The blue heat range is at 300 deg. C. in the hypo-eutectoid steel regardless of heat treatment or grain size. The results obtained in Table VII and VIII were by means of hand loading and were taken from Dr. Leiter's thesis.<sup>25</sup>

A comparison of the various series of 0.87 carbon steel (by the constant water method) are shown in Tables IX and X. The blue heat range, according to the maximum breaking weight, is at 400 deg. in the pearlitic, 300 deg. in the partially spheroidized and water quenched steels, and at 250 deg. C. in the oil quenched series which may be due to the conversion of austenite to martensite at this particular temperature.

Blue brittleness, indicated by the angle of twist in revolutions, is at 400 deg. in the pearlitic and normalized steels, and at 250 deg. in the partially spheroidized steels. There is no minimum angle in the oil quenched series as the ductility increases steadily with temperature, and if a slight drop does occur it is over-shadowed by the gain of ductility. The slight drop in the angle of twist of the quenched series at 100 deg. C. is a function of temperature. Carbide brittleness is shown to exist at 200 deg. in the pearlitic, and normalized steels, while it is at 150 deg. in the partially spheroidized series. Secondary brittleness is exhibited at 600 deg. C. in the pearlitic and normalized series, while at 500 deg. C. in the spheroidized material.

<sup>25</sup> R. W. E. Leiter, Doctorate's Thesis, Harvard University, 1930.

Table XI shows that the maximum breaking load is at 400 deg. C. in the pearlitic and normalized steels, 300 deg. in the spheroidized (water quenched) and at 250 deg. C. in the slowly cooled spheroidized steels. At 200 deg. in all the steels, except the normalized series, there exists a range of brittleness. The weight above and below this temperature is greater than that existing at this particular point.

The minimum angle of twist, indicating blue brittleness, is at 250 deg. in the pearlitic and water quenched spheroidized steel while at 200 deg. C. in the normalized, and at 300 deg. in the slowly cooled spheroidized steel. Carbide brittleness is shown to exist at 150 deg. C. in the pearlitic and slowly cooled spheroidized steels. Secondary brittleness is recorded in the spheroidized steels while transformation shortness is revealed in the pearlitic and normalized series. (Table XII.)

Three series of cast steels were also tested in torsion "as received," annealed, and air cooled condition. The carbon content of the steel was 0.30 per cent. The cast material was heated at 1000 deg. C. for 5 hr. before being either furnace or air cooled. Tests were conducted at the various temperatures indicated, and under the same conditions as the previous material.

The three dimensional diagram, Fig. 16, shows that the weight reaches a minimum at 150 deg. C. before it rises to its maximum strength at the blue heat range which is at 400 deg. C., thereon it diminishes with further increase of temperature. Minimum angles are at 200, 400 and 700 deg. C. Transformation shortness is not recorded here as the temperature of test is too low.

Fig. 17 indicates that breaking weight in the annealed steel is fairly constant, except for the slight drop at 250 deg. C. The maximum breaking weight is at 300 deg., and declines slowly with increasing temperature. The two minimum angles at 250 and 650 deg. C., indicate blue heat and secondary brittleness, respectively.

The breaking weight exhibits two maximum loads at 150 and 300 deg. C. (Fig. 18), while the minimum angles denoting carbide, blue, and secondary brittleness are at 150, 250 and 650 deg. C., respectively,

The greatest loss in strength in

FIG. 17—Torsional data for 0.30 carbon annealed cast steel. Blue heat and secondary brittleness are at 250 and 650 deg. C. respectively.

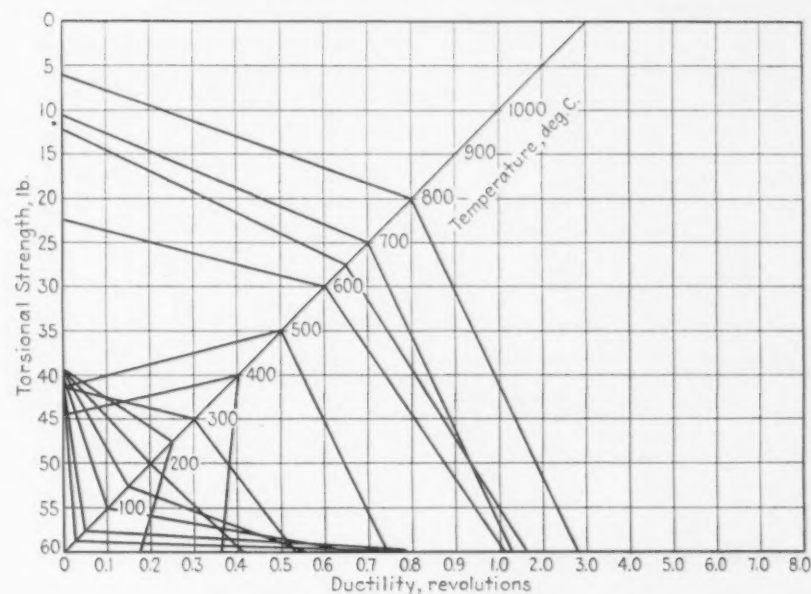


TABLE X  
Angle of Twist for 0.87 Carbon Steel in Various Heat-Treated Conditions

Temperature in Deg. C.	Pearlitic	Normalized	Spheroidized	Water Quenched	Oil Quenched
R. T.	0.680	0.111	0.244	0.000	0.022
50	0.556	0.092	0.361	0.005	0.036
100	0.528	0.202	0.310	0.000	0.017
150	0.667	0.139	0.167	0.001	0.031
200	0.500	0.139	0.306	0.028	0.111
250	0.528	0.389	0.263	0.050	0.223
300	0.556	0.722	0.282	0.139	0.389
400	0.514	0.444	1.11	0.389	1.07
500	1.84	2.03	1.04	1.00	2.07
600	1.67	1.03	1.32	1.69	...
700	...	1.11	1.45	...	...

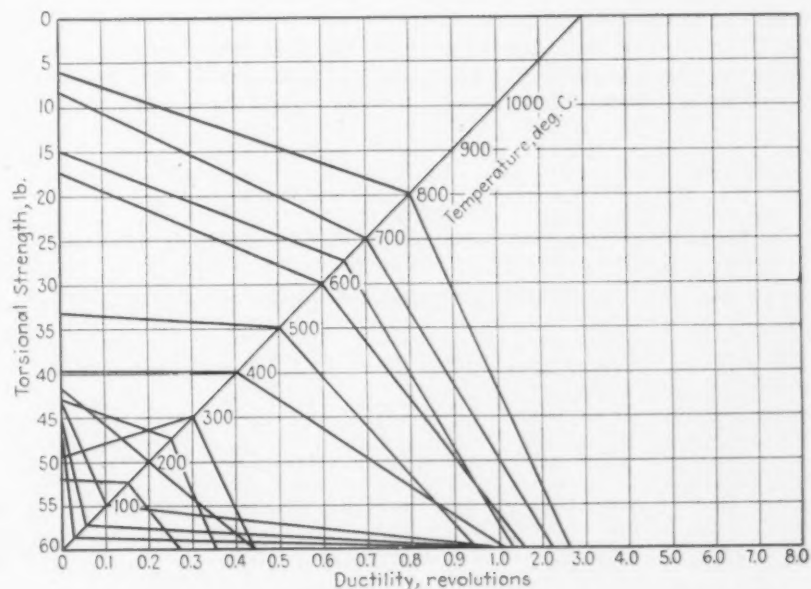


FIG. 18—Torsional data for 0.30 carbon cast steel in the air-cooled condition. Carbide, blue, and secondary brittleness are at 150, 250 and 650 deg. C. respectively.



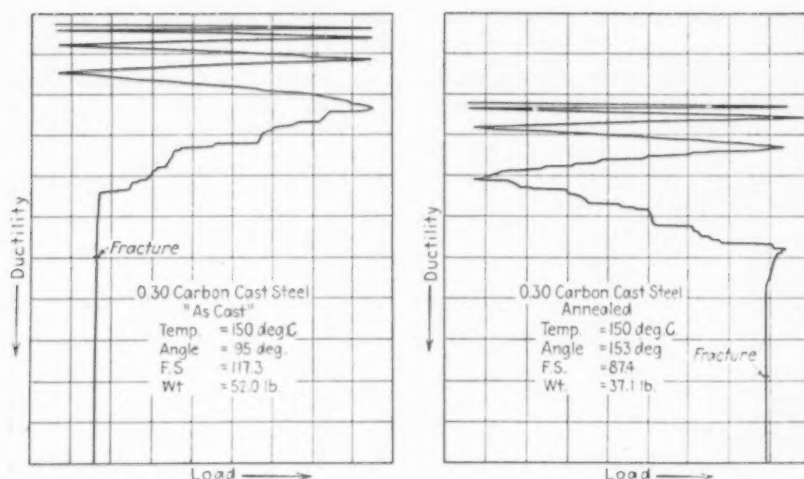


FIG. 19—Typical examples of actual torsional stress-strain diagrams showing some steps in their blue heat range.

the cast steels for any small temperature increase is at 600 deg. C. At this particular temperature the steel loses approximately 50 per cent of its strength that it retained at 500 deg. C. This loss of weight is very sudden and weakens the steel, causing it to fail very quickly.

Some typical illustrations of the torsional stress-strain diagrams of the cast steel, showing some steps in their blue heat range, are shown in Fig. 19. These curves further illustrate that blue brittleness is a precipitation phenomenon and can always be detected by steps, and the finest, sharpest and smallest steps always indicate the maximum blue heat range or greatest resistance to slip or minimum ductility (angle of twist).

The results obtained from a series of low and high carbon 18-8 Cr-Ni steels are very interesting from many points of view. They illustrate three types of brittleness

previously discussed, blue brittleness, secondary brittleness and transformation shortness.

The low carbon 18-8 steel tested contained 0.06 per cent carbon while the high carbon steel had 0.15 per cent. The steels were tested in the annealed austenitic condition which was obtained by quenching from 1000 deg. C. in water. The first series tested was the low carbon material. Fig. 20 presents two diagrams of the series of stress-strain diagrams obtained in torsion by the constant water loading method. The steel at room temperature is very strong and at first resists deformation, but gradually yields with increasing load until it finally steps before failure.

#### Stainless Steel Has Blue Heat Range

The next test was preheated at 650 deg. C. for 10 min. before the loading, and the diagram (Fig. 20)

shows that the steel gave entirely by means of small, regular, defined steps. Preheating the bar at 650 deg. C. for one hour causes the steps to become larger, irregular and less in number. Soaking for two hours accentuates the size and definition of each step but further reduces the number. A 10-hr. preheating period almost obliterates the stepping tendency and causes the steel to yield in a continuous step or a series of small irregular steps, one upon the other.

The high carbon 18-8 Cr-Ni steel revealed a marked tendency to step just before failure in the room temperature test. Heating 10 min. in the preheated furnace caused the material to give by means of small irregular steps. This tendency is reduced by heating 30 min. at the above temperature and is gone entirely in the one hour soak.

From the characteristics of the above stress-strain diagrams, it may be concluded that precipitation or a pseudo blue heat range has occurred as this phenomenon of steps is only observed in the blue heat range. What is meant by a pseudo blue heat range is a range that has all the characteristic properties of the blue heat range but not the identifying blue coloration which is a property of carbon steels and iron when they are heated in their blue range. It is due entirely to this occurrence that this range of brittleness has been designated as the "blue heat range," as the coloration is produced by a film of oxide on the surface of the material. Heating at this particular temperature (650 deg. C.) does not blue stainless 18-8 steels, but causes it to exhibit all the other characteristics of the blue heat range. In order to differentiate it from the normal blue heat range, it is called the "pseudo blue heat range."

The cause of brittleness at this particular temperature in 18-8 steel may be attributed to three facts: (1) transformation shortness, (2) precipitation (pseudo blue brittleness), and (3) secondary brittleness. Since the original material is in the annealed or austenitic condition, sufficient heat and time will cause it to transform to alpha iron with precipitation of carbide in a submicroscopic condition. This transformation of austenite is affected by three factors: (1) temperature, (2) time, and (3) deformation. These factors are characteristic of all solid

TABLE XI  
Breaking Weight for 1.20 Carbon Steel in Various Heat-Treated Conditions

Temperature in Deg. C.	Pearlitic	Normalized	Spheroidized <sup>a</sup>	Spheroidized <sup>b</sup>
R. T.	45.6	61.8	56.1	44.6
50	47.5	58.0	50.8	41.9
100	44.2	53.1	50.5	40.3
150	44.2	49.5	48.5	39.5
200	43.4	63.4	47.5	38.3
250	44.3	48.8	57.8	39.2
300	51.3	65.3	60.6	36.4
400	53.0	65.4	42.7	31.2
500	38.0	38.2	34.4	25.2
600	20.7	17.6	17.9	15.9
700	8.8	14.0	10.1	...
800	7.9	10.0	8.7	...

<sup>a</sup> Water quenched from 1000 deg. C. heat-treated at 650 deg. C. for 72 hrs.

<sup>b</sup> Slowly cooled from 1000 deg. C. and held at 650 deg. C. for 72 hrs.

solutions and is here applicable as austenite in a solid solution of carbon or carbide in gamma iron. The decomposition of austenite is a time-temperature function and as soon as one is varied the other is automatically changed, a low temperature requires longer time and vice-versa—high temperature requires a short heating period. Austenite will transform much faster to alpha iron when it is cold worked as cold work distorts the lattice, thereby decreasing the solubility and creating a state of supersaturation which causes a change of lattice and precipitation. This is similar to the working of Hadfield manganese steel, which is first in the austenitic condition and then converted to the martensitic or deformed alpha iron (tetragonal) with precipitation. Working at room temperature is sufficient to cause the gamma iron solid solution to transform to alpha iron as is observed in the room temperature stress-strain diagram of both the low and high carbon steels.

#### Torsional Yield and Strength Can Be Determined

Summing up briefly, a state of supersaturation is created by the transformation of gamma to alpha iron causing a rejection of carbon in the form of a carbide in the crystallographic planes and axis of the ferrite lattice. This rejection interferes with slip, causing slip resistance which is recorded as steps in the stress-strain diagrams. The transformation of gamma to alpha iron also creates slip interference by the mechanism explained in transformation shortness, as this is a transformation effect, while the precipitation from a supersaturated solid solution is known as blue brittleness. Another factor which also interferes with slip, and causes slip resistance, is secondary brittleness. This should not be overlooked as recrystallization is a physical property of the material and exists in the metal regardless of heat treatment. The three factors that may cause brittleness in 18-8 Cr-Ni stainless steels are, transformation, precipitation and recrystallization or transformation shortness, pseudo blue brittleness and secondary brittleness.

Stress-strain diagrams obtained from the torsional data on these steels illustrate the statements made above.

The last series which was ex-

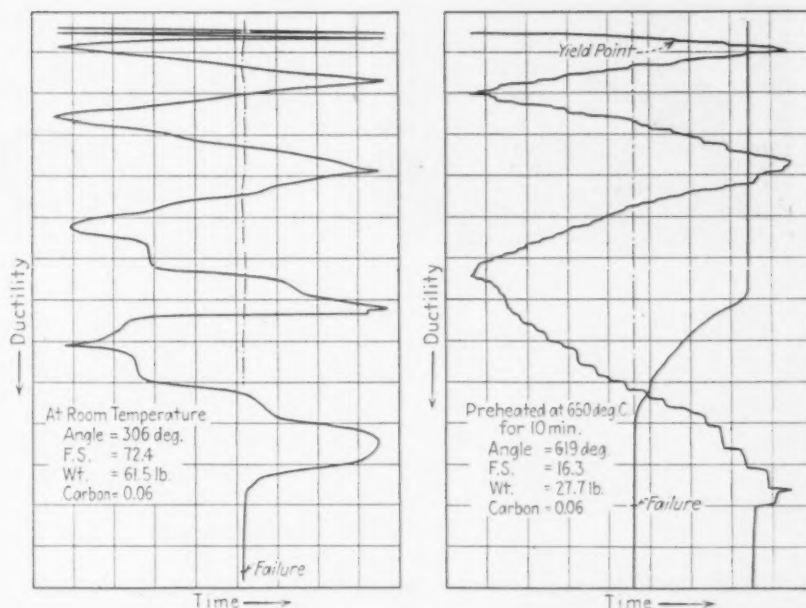


FIG. 20—Actual torsional stress-strain diagrams for low-carbon 18-8 stainless steel. Note that the slight preheating causes the steel to give by means of small, regular, well-defined steps.

amined in order to prove the theme of this dissertation was Swedish wrought iron. For this material the weight increases steadily until it reaches its maximum at 250 deg. C., and then declines slowly. The angle of twist diminishes from room temperature to 200 deg. C., and then rapidly increases, so that at 250 deg. it is almost twice that existing at 200 deg. C. Blue brittleness is observed at 300 deg. C., and secondary brittleness at 600 deg. Both these ranges are observed by their minimum angle of twist. Transformation shortness was not investigated in this material, for the the results obtained at elevated temperatures varied greatly as there is a marked varia-

tion in the structural composition of the material. Any torsional stress-strain diagrams for this material which show a marked tendency to step are exceptional.

A word on torsional failure and conversion should be appropriate in closing. The ductility (angle of twist) is determined by measuring the angle from the moment the load is applied to the instant that the bar ruptures. As is observed in all the torsional stress-strain diagrams a marked ductility always precedes failure, except in the case of quenched material. This plastic deformation, which is always taken into account, should not be included in the ductility as

(CONCLUDED ON PAGE 76)

TABLE XII

Angle of Twist for 1.20 Carbon Steels in Various Heat-Treated Conditions

Temperature in Deg. C.	Pearlitic	Normalized	Spheroidized*	Spheroidized <sup>b</sup>
R. T.	0.430	0.166	0.361	0.505
50	0.500	0.133	0.278	0.667
100	0.556	0.166	0.251	0.611
150	0.494	0.177	0.361	0.500
200	0.458	0.105	0.333	0.588
250	0.328	0.125	0.319	0.625
300	0.341	0.310	0.348	0.532
400	0.466	0.319	0.500	1.340
500	0.736	0.500	1.080	1.100
600	0.930	0.639	0.806	1.840
700	1.50	1.190	1.530	...
800	1.42	0.917	2.00	...

\* Water quenched from 1000 deg. C.; held at 650 deg. C. for 72 hrs.

<sup>b</sup> Slowly cooled from 1000 deg. C.; held at 650 deg. C. for 72 hrs.



# OLD AGE

## *I—History and*

**S**Ocial security measures, so called, are moving rapidly toward decisive legislative action. It is well for all of us to know as much as possible about their background and probable cost.

The accompanying article is the first of two dealing with old age pensions. It is based upon a factual report compiled by a Committee on Social Legislation acting jointly for the National Conference of Business Paper Editors and the Associated Business Papers, Inc. Full copies of the printed report of this committee on old age pensions, which is intended primarily for the information of business paper editors, may be had by interested readers from the headquarters of the Associated Business Papers, Inc., 330 West 42nd St., New York. A charge of 10 cents per copy is made to cover the printing cost. A similar factual report has been issued on the subject of Unemployment Compensation.

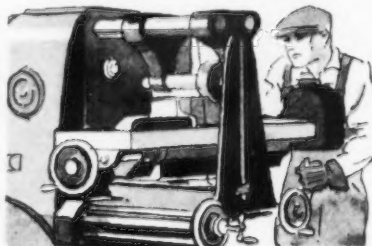


**OLD** age dependency is chiefly a result of modern industrial developments which have replaced the independent artisan with an employee, dependent upon others for a job. The swifter pace of modern industry is constantly shortening the working lives of all employees and decreasing the opportunities for work for the older ones. Of the total male population of 16 years or older, according to the Census of 1930, nearly 8 per cent were 65 years old or older, but those in this older group who were working were only 5 per cent of the total male population of working age. More than 90 per cent of males between 16 and 65 were gainfully employed, but only 58 per cent of older men.

The constantly increasing span of life resulting from better understanding of the human anatomy has added to the severity of the old age problem. The average life span in the United States has increased by 50 per cent during the last 90 years, from 39 years in 1840 to 60 years in 1930. As a re-

sult the number of persons over 65 years old had likewise increased from 2½ of the total in 1850 to 5.5 per cent in 1930. During this 80-year period the total population increased five times while the number of aged persons increased 11 times. In 1930 there were 6,634,000 citizens of the United States more than 65 years old.

Under modern industrial conditions aged workers are largely eliminated from many industrial occupations. It is well known that an official or non-official age line, preventing the hiring of men over 40 to 45 years old, has been established in many individual plants and industries. The effect of this movement, influenced by increased mechanization of industry and a resulting need for a faster work-



ing pace, is shown in the Census of 1930. Then there were 7.78 per cent of the male population that were over 65 years old but those of that age who were working were only 5.15 per cent of the total male population. There were 90.5 per cent of all males from 16 to 65 gainfully employed in 1930, but only 58.3 per cent of those older.

The proportion of older workers who still had jobs varied widely among various occupations. The proportion of old farmers, lawyers, judges, retail dealers, bankers, brokers and occupations of that type, who still had jobs in 1932, was substantially higher than the general average of 5.15 per cent. On the other hand, only from one-half to one-quarter of the average of old persons in mechanical trades were working. Only 2.3 per cent of miners, 1.3 per cent of cotton mill operatives, 2.6 per cent of machinists, 2.2 per cent of store clerks and 0.75 per cent of locomotive engineers over 65 had jobs.

A study of old age conditions in Massachusetts in 1925 disclosed that only 1486 of the 2818 old men studied had work. About two-thirds of them had formerly been employed in manufacturing industries but less than half worked beyond 65. In 1928 the National Civic Federation found only half the old men studied who had worked in industry were still employed. A study in 1930 in New York State disclosed the fact that of the 100,000 machinists at work in the state only 1900 or 1.8 per cent were over 65, that only 8800, 2.7 per cent, of the 370,000 who were doing heavy work of railroads and transportation were employed.

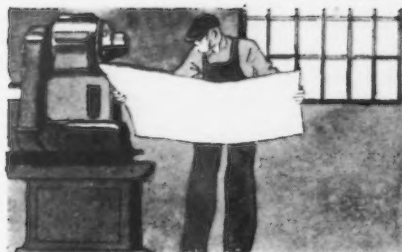


GE

# PENSIONS

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## *Social Background*



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At the same time, however, 14 per cent of the employed farmers in the state were over 65, 6 per cent of lawyers, 10 per cent of clergymen. A study in 1929 by the National Manufacturers' Association reported that 30 per cent of the concerns investigated had definite age limits ranging from 25 years to 70, with general agreement on 45 years for unskilled labor and 50 for skilled.

A number of studies have been made, all of which show that a substantial proportion of aged persons have no property and no income and are entirely dependent upon others for their continued existence. In a recent study by the National Civic Federation it was estimated that 25 per cent of the men and 34 per cent of the women over 64 owned no property at all. On a national basis this includes 1,900,000 of the 6,600,000 aged. About 40 per cent of the total (2,600,000) had no incomes and 17 per cent (1,000,000) had neither property nor income. Over 25 per cent of the aged were unable to work, 30 per cent more were able to do light work only. About 60 per cent of those who were dependent received no aid from anyone, while the remainder were helped by their children chiefly, and to some extent by other relatives and friends.

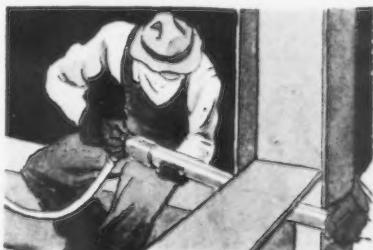
Similar studies made by several states in preparation for the installation of pension systems indicate that 2,700,000 of the 6,600,000 persons more than 65 years old, nearly 41 per cent, are entirely dependent.

To meet this ever-growing problem, the Administration's old age

pension program, embodied in the Wagner-Lewis social security bill now before Congress, offers a three-fold solution:

First, a national system of compulsory and contributory old age insurance which will include virtually all employees of the country who receive less than \$250 a month; second, a system of Federal subsidies to the states to help provide pensions for needy aged persons not included in the first plan; and last, a voluntary system of old age annuities to provide a course of protection for persons not included in the compulsory plan.

The national system of compulsory, contributory pensions will be financed by a Federal payroll tax increasing from 1 per cent during the first five years of operation of the plan, to 2 per cent during the next five years, and thus to 5 per cent after 20 years, where it remains. Employers and employees share the cost of the tax equally. Employees 65 years old who have been contributing for 200 weeks during a five-year period which started before age 60, and who are not employed, are eligible for pensions. The amount of the pension varies with the date an employee enters the plan and with the number of contributions that have been



made to the pension fund in his behalf. For employees who enter the plan before 1942, 15 per cent of their average monthly wage is paid for the first 200 weekly contributions made, plus 1 per cent additional for each 40 contributions above 200 up to 400. For each 40 contributions made above 400 the increase in pension payments is 2 per cent. For employees who enter the plan in 1942 and later, the pension is 10 per cent of average monthly income plus 1 per cent more for each additional 40 contributions.

Under the second pension plan, \$50 millions is appropriated from Treasury funds for the first year of operation and \$125 millions for each subsequent year. These funds are allotted to states with old age pension laws approved by the Federal authorities in amounts equal to what the states and their local subdivisions contribute, but not more than \$15 per month for each pensioner. Definite standards are set up for state pension laws to entitle them to Federal grants.

Under the third system of voluntary old age annuities, the Federal Government will sell to individuals on a cost basis annuities similar to those offered by insurance companies. These annuities would be available to anyone but would be limited to a maximum maturity value of \$9,000 and to a monthly annuity of \$50.

The unemployment insurance proposal calls for contributions of 3 per cent of their payrolls by all employers of four or more employees. Contributions are to be made to the United States Treasury but credits up to 90 per cent

TABLE 1—PENSION LAWS IN THE UNITED STATES—STATE WIDE MANDATORY SYSTEMS

State	Date of Establishment	Pensionable Age	Years of Citizenship and in State Required	Maximum Monthly Pension	Source of Funds	Average Monthly Pension Paid	Monthly Poorhouse Cost
Alaska .....	1915	65	25	\$35	Territory	.....	.....
Minnesota .....	1929	70	15	\$1 per day	County	\$20.23	\$56.29
Wyoming .....	1929	65	15	\$30	County	13.88	78.74
California .....	1929	70	15	\$1 per day	State $\frac{1}{2}$	22.08	44.74
					County $\frac{1}{2}$	.....	.....
Massachusetts .....	1930	70	20	None	State $\frac{1}{3}$	25.00	47.70
					Local $\frac{2}{3}$	.....	.....
New York .....	1930	70	10	None	State $\frac{1}{2}$	23.80	39.61
					County $\frac{1}{2}$	.....	.....
Delaware .....	1931	65	5	\$25	State	9.84	46.24
Idaho .....	1931	65	15	\$25	County	.....	47.26
New Hampshire .....	1931	70	15	\$7.50 per week	County	17.18	44.19
New Jersey .....	1931	70	15	\$1 per day	State $\frac{3}{4}$	15.28	42.13
					County $\frac{1}{4}$	.....	.....
Arizona .....	1933	70	35	\$30	State 67%	.....	56.80
					County 33%	.....	.....
Colorado .....	1933	75	15	\$1 per day	State	.....	42.30
Hawaii .....	1933	65	15	\$15	County	.....	.....
Indiana .....	1933	70	15	\$15	State $\frac{1}{2}$	.....	36.96
					County $\frac{1}{2}$	.....	.....
Maine .....	1933	65	15	\$1 per day	State $\frac{1}{2}$	.....	53.42
					County $\frac{1}{2}$	.....	.....
Michigan .....	1933	70	10	\$30	State	.....	.....
Nebraska .....	1933	65	15	\$20	County	.....	.....
North Dakota .....	1933	68	20	\$150 per year	State	.....	61.71
Ohio .....	1933	65	15	\$25	State	.....	.....
Oregon .....	1933	70	15	\$30	County	.....	28.63
Pennsylvania .....	1933	70	15	\$30	State	.....	.....
Washington .....	1933	65	15	\$30	County	.....	.....
Iowa .....	1934	65	15	\$25	State	.....	.....

## County Optional Systems

Montana .....	1923	70	15	\$25	County	\$15.55	\$55.19
Nevada .....	1925	65	10	\$1 per day	County	Not Operative	81.66
Wisconsin .....	1925	70	15	\$1 per day	State $\frac{1}{3}$	19.27	35.63
					County $\frac{2}{3}$	.....	.....
Kentucky .....	1926	70	10	\$250 per year	County	Not Operative	25.44
Maryland .....	1927	65	10	\$1 per day	County	.....	40.89
Utah .....	1929	65	15	\$25	County	9.00	45.62
West Virginia .....	1931	65	10	\$1 per day	County	.....	38.70

TABLE 2—NUMBER OF PENSIONERS—DEC. 31, 1933—STATE WIDE MANDATORY SYSTEMS

State	Number of Counties in State	Number Paying Pensions	Population of Pension Counties	Number of Pensioners Dec. 31, 1932	Number of Pensioners Dec. 31, 1933	Pensioners per 1000 Population
Arizona .....	14	14	436,000	.....	1,629	3.74
California .....	58	58	5,677,000	12,520	14,604	2.57
Colorado .....	63	53	904,000	.....	8,139	9.01
Delaware .....	3	3	238,000	1,565	1,586	6.65
Idaho .....	44	32	347,000	1,078	1,288	3.71
Massachusetts .....	14	14	4,250,000	17,051	18,516	4.36
New Hampshire .....	10	10	465,000	884	1,131	2.43
New Jersey .....	21	19	3,280,000	7,000	9,015	2.75
New York .....	62	62	12,588,000	54,185	51,106	3.32
Wyoming .....	23	20	211,000	573	501	2.37

## County Optional Systems

Maryland .....	24	1	805,000	143	141	9.18
Minnesota .....	37	6	1,076,000	2,090	2,566	2.39
Montana .....	56	41	360,000	1,036	1,034	2.87
Utah .....	29	9	338,000	1,147	944	2.79
Wisconsin .....	71	7	1,029,000	1,678	1,756	1.71
Total .....			32,004,000	100,950	113,956	3.57

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56.29  
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of the tax may be made for contributions to an approved state compensation fund, and, to induce stabilization of employment, employers get credit against the Federal tax for their state contributions and allowances for good employment records.

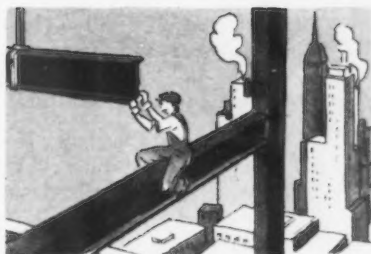
Efforts to solve the problem, both private and public, have resulted in a wide array of pension plans. Because of their potential importance upon the solution of the whole problem of old age security, the legislative activities in regard to the subject merit first attention.

The first old age pension law was passed in 1914 by Arizona, and was promptly declared to be unconstitutional. There was a nine-year lag until the effects of this decision passed away and, in 1923, pension laws were enacted in Montana, Nevada and Pennsylvania. The Nevada law was repealed and a new one substituted in 1925. The Pennsylvania law was also declared unconstitutional and not until 1933 was it possible to get another pension law approved by the state.

Wisconsin adopted a pension law in 1925, Kentucky in 1926, Colorado and Maryland in 1927; California, Minnesota, Utah, and Wyoming in 1929; New York and Massachusetts in 1930; Delaware, Idaho, New Hampshire, New Jersey, and West Virginia in 1931; Arizona (19 years after its failure in 1914), Indiana, Maine, Michigan, Nebraska, North Dakota, Ohio, Oregon, Pennsylvania and Washington in 1933. Alaska adopted such a law in 1915 and Hawaii in 1933. Thus 28 states and two territories have already taken a first step toward assuring some extent of security for their aged citizens.

In Table 1 are listed all of those states which have enacted pension laws, with the date of establishment of each plan, the pensionable age, the residential and citizenship requirements for eligibility for a pension, the maximum monthly pension provided, the source of the pension funds, the average monthly cost of pensions per pensioner and, when available, the comparative cost per person of maintenance in poorhouses.

In Table 2 are shown facts about the operation of pension plans at the end of 1933. The information includes the number of counties in each state, the number of counties paying pensions, the population of pension-paying counties, the num-



ber of pensioners at the end of 1932 and 1933, and the number of pensioners for each 1000 of population.

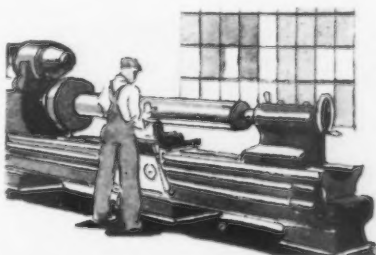
The age at which pension payments begin under state plans is 70 years in 14 states, 65 years in 12 states and two territories, 75 in one state and 68 in another.

Considerably wider variations will be found in the maximum pensions which may be paid. In nine states it is \$1 per day; \$30 per month and \$25 per month are each specified by six states, while New York and Massachusetts set no maximum. Other payments used by individual states are \$20 and \$15 a month, and \$7.50 a week.

There is not much variation in the sources of funds to pay pensions. In 13 states counties pay it all and in seven more the state bears all the cost. A 50-50 split between state and county is made in four states and two more require two-thirds of the cost from the county and one-third from the state. Another state reverses this ratio, and the last of the 28 states requires three-quarters from the state and the remainder from the county.

#### Industrial Pension Plans

In general, the coverage of workers in the United States has been limited to a few industrial fields. About 80 per cent of all protected persons are employees of railroads, public utilities, iron and steel manufacturers, petroleum industries and electrical apparatus and supply plants. About 90 per cent



of all employees of cable, telephone, and telegraph companies, 80 per cent of the employees of Class I railroads and about 50 per cent of the employees of street and electric railways are protected by formal pensions.

Although the number of employees in other industries who are included in pension plans is sometimes large, the proportion of those covered to all in the industry is negligible. In general it is the large concerns, employing many thousands of workers, that adopt pension plans, so that the number of employees included in private plans is relatively larger than the number of plans in operation.

What was probably the first formal industrial pension plan established in America was that of the Grand Trunk Railway of Canada in 1874. In the following year the American Express Co. took a similar step and in 1880 the Baltimore and Ohio set up a pension plan of its own. No further progress occurred until 1900 when the Pennsylvania Railroad provided pensions for its employees, initiating a movement that has resulted in protecting over 80 per cent of employees of Class I railroads, more than a million and a half, against old age hazards, and has made them the most fully protected group in the country.

The railroad pension plans now in effect are entirely voluntary, inasmuch as the railroads have assumed no legal obligation for the payments. At the last session of Congress a compulsory Railroad Retirement Act was passed which is being contested before the United States Supreme Court. This act provides for compulsory retirement at age 65 (except by mutual agreement which may postpone retirement age to 70). The annuity to be paid is arrived at by multiplying the number of years of service of the employee (not exceeding 30 years) by the following percentages of the monthly compensation: Two per cent of the \$50; one and one-half per cent of the next \$100, and one per cent of the amount in excess of \$150.

No part of any monthly compensation in excess of \$300 is recognized in computing the annuity. These restrictions limit the maximum pension payment to \$120 a month. Funds to meet these pension payments are to be obtained



by a levy of 2 per cent of employee's wages, plus a payment of twice that sum by the employer.

The next great industry to become interested in pensions was public utilities, and in 1892 Consolidated Gas Co. put such a plan into effect. From that date until 1911, 10 more pension plans were established by public utilities, seven of them by street railways.

In 1929 there were 64 pension plans in operation in banking, insurance, railroads and public utilities, covering 666,000 employees.

In the field of banking the first pension plan was established in 1899, but only two more were put into effect during the next ten years. In 1929 there were 11 such plans in operation, covering 14,600 employees.

Among the manufacturing industries, Alfred Dolge, a felt manufacturer, started the first pension plan in 1882. The next plan was set up in 1892 by the Solvay Process Co., but both of these plans failed before the end of the century.

The Carnegie Steel Co. established the earliest manufacturing industry pension plan still in op-

TABLE 3—FOREIGN PENSION LAWS NOW OPERATING CONTRIBUTORY SYSTEMS

Country	Date of Establishment	Class of Workers Covered	Pensionable Age	Contributors	Number of Persons Covered
Germany	1889	Wage earners	65	Workers, employers and state	18,000,000
Iceland	1909	All citizens	65	Workers and state	
Luxemburg	1911	All workers	65	Workers, employers and state	50,000
Germany	1911	Salaried workers	65	Workers and employers	
Poland	1911	Wage earners in former German territory		Workers, employers and state	926,000
Netherlands	1913	All workers	65	Employers and state	2,547,099
Sweden	1913	All citizens over 16 years	67	Workers and state	3,728,000
Italy	1919	All workers	65	Workers, employers and state	5,500,000
Portugal	1919	All workers	70	Workers, employers and state	
Spain	1919	All workers	60	Employers and state	3,993,000
Uruguay	1919	All workers	60	Employers and state	
Cuba	1921	Transportation		Workers and employers	95,000
Russia	1921	All workers	men 60 women 65	Employers	
Lithuania	1922	All workers	65	Workers and employers	50,000
Brazil	1923	Public utility workers		Workers and employers	140,435
Greece	1923	All workers	men 65 women 60	Workers and employers	
Belgium	1924	Wage earners	men 65 women 60	Workers, employers and state	
Bulgaria	1924	All workers	60	Workers, employers and state	220,000
Czechoslovakia	1924	Wage earners	65	Workers, employers and state	2,035,959
Belgium	1925	Salaried employees	men 65 women 60	Workers and employers	
Chile	1925	Salaried employees	50	Workers and employers	80,000
Chile	1925	Wage earners	55	Workers, employers and state	1,203,500
Great Britain	1925	All workers	65	Workers, employers and state	17,263,000
Northern Ireland	1925	All workers	65	Workers, employers and state	350,000
Austria	1926	Salaried employees	men 65 women 60	Workers and employers	212,000
Bolivia	1926	Bank employees		Workers and employers	
Poland	1928	Salaried employees	65	Workers and employers	225,000
France	1928	All workers	60	Workers, employers and state	4,000,000
Hungary	1928	All workers	65	Workers, employers and state	628,000
Czechoslovakia	1929	Salaried workers	men 65 women 60	Workers and employers	359,000
Roumania	1912	Geographic and economic groups	65	Workers, employers and state	620,000
Paraguay		Railway employees		Workers and employers	916

Non-Contributory Plans

Country	Date of Establishment	Pensionable Age	Maximum Annual Income for Pension	Maximum Pension per Year	Number of Pensioners
Denmark	1891	65	Varies	Varies	123,000
New Zealand	1898	men 65 women 60	£80	£40 18s.	29,000
Great Britain	1908	70	£49 17s. 6d.	£26	850,000
Irish Free State	1908	70	£39 5s.	£26	112,000
No. Ireland	1908	70	£49 17s. 6d.	£26	41,000
Newfoundland	1911	75		\$50	3,000
Greenland	1926	55			500
Guernsey, Isle of	1926	70	£40	£20 16s.	500
Canada, except Quebec and New Brunswick	1927	70	\$365	\$240	66,000
Union of South Africa	1928	65	£54	£30	53,000

eration. When this company was absorbed by the United States Steel Corp. in 1911, the pension was continued, with some modification. In 1903 the Standard Oil Co. of New Jersey began paying pensions and in 1918 several units of the old company, which had been dissolved in 1911, adopted formal pension plans. In 1929 there were 139 pension plans reported to be in operation in manufacturing establishments including 1,228,000 workers.

#### Other Forms of Pension

Among the other existing pension systems in the United States it is interesting to note that only eight of the hundred or more trade unions affiliated with the American Federation of Labor are known to have formal pension plans in operation. Three railroad unions also maintain pension systems.

All classified civil service employees of the Federal Government are included in a pension plan to which they contribute  $3\frac{1}{2}$  per cent of their average earnings. In 1932 there were 25,600 pensioners on the Federal rolls who were receiving an average annual income of \$935.

Most states have pension plans which cover normally permanent employees of the state, such as judges and teachers. In some states employees contribute to the pension fund. New York has about 2000 pensioners, Massachusetts 425, Pennsylvania 300, New Jersey 150, California 100, Connecticut 60, and Maine 15.

Since New York City established in 1857 the first pension plan for policemen a large number of cities have developed similar plans, protecting both police and fire department employees. However, most such plans are the result of hasty legislative enactment and, save for those recently established, have no actuarial basis. Today, between 400 and 500 American cities have such plans in operation.

The nation's teachers form a group which has been substantially protected against old age hazards. In 1926 a study of teachers' pension plans operating in 16 states and in seven large cities showed about 427,000 teachers were covered and 17,000 were receiving an average of \$557 a year. In 1906 the Carnegie Foundation for the Advancement of Teaching started a pension plan for old teachers of approved colleges, universities and



technical schools, which were receiving support from the Foundation. Later changed to a contributory type this plan at the end of 1931 gave more than 10,000 teachers annuity contracts for \$16,540,000 of annual income for their old age, more than \$1,600 annually per teacher.

Ministers are among the best protected class of citizens in the country. Retirement funds, usually contributory and based on sound actuarial principles, are in operation in 15 Protestant denominations. In 1929 the Bureau of Labor Statistics estimated that 14,806 ministers in 13 denominations were receiving pensions and 6195 were being aided by relief plans. Total payments during the year were nearly \$7,000,000, an average of \$373 for pensioners and \$225 for relief.

What is perhaps the largest and most expensive old age pension system in the world is our Federal system to protect those who have been in our wars. From 1866 to June 30, 1932, a total of \$8,540 millions was spent for military and naval pensions. In 1932 there were 438,000 persons on the Federal rolls and \$233 millions was spent on them. In that year there were 478 pensioners of the War with Mexico, 171,000 of the Civil War, nearly 10,000 of the Indian Wars, 234,000 of the War with Spain, 23,000 of the regular military establishments, 50 veterans of the World War, and seven persons still receiving pensions for the War of 1812, which ended more than 120 years ago. The average annual pension paid was \$513 in 1931.



The poorhouse, or almshouse, is the oldest method for caring for aged persons without independent means. Every state except New Mexico has almshouses and in 40 states they are owned and administered by the counties. In a study of poorhouses made in 1925 by the U. S. Bureau of Labor Statistics, covering 2183 institutions, 93 per cent of the total, there were found to be 85,889 inmates.

#### Other Types of Old Age Relief

A slightly smaller number of aged persons are cared for in various benevolent houses. There were nearly 1300 of them in 1929 and they cared for about 69,000 aged persons. Detailed information concerning 1036 benevolent houses showed that 444 were supported by religious bodies, 360 by philanthropic organizations, 102 by fraternal orders, 55 by Federal and state governments, 33 by various national groups and 43 by trade unions and other organizations.

For dependent persons whose condition does not permit their removal to an almshouse, public outdoor relief has long been the attempted remedy. Grants, usually in kind and rarely in cash, are doled out from funds provided by taxation. Experience with this system has been uniformly bad. Inefficiency, waste, political manipulation have been prevalent in the many states which have not changed their outdoor relief procedure during recent years.

Personal savings and insurance are the remaining methods available for assuring an independent old age, but neither of them has been particularly effective in meeting the problem. The annual income of a large number of our working class families is too small to make possible direct savings of an amount large enough to provide security for old age. Whatever savings can be made are usually expended long before retirement age in meeting the other emergencies of life and nothing is left for old age.

#### Annuities a Minor Factor

The extent to which annuities have been purchased by individuals is small. The most important development in this field has been the growth of group annuity sales by insurance companies to employers for protection of their employees. This type of insurance is the newest form of group insur-



ance which is offered to employers; group life, group health and accident, and group accidental death and dismemberment insurance having been available for many years. In a recent study made by the National Industrial Conference Board, eight leading life insurance companies had, in 1933, 226 group annuity policies in force, covering 194,000 employees for an average monthly retirement income of \$43.53. Since many of these policies were purchased to replace old company pension plans, this is not a net gain in the number of employees who are protected but it does insure them with substantially safer security than was provided by many company pension plans.

Compared with American experience, national old age pensions are an old story in Europe. French seamen were protected in 1673. Civil servants and miners of Liege were protected by Napoleon. Even Russian Czars pensioned miners of state mines in 1797 and employees of government factories seven years later.

In 1833 France set up a government plan of selling annuities, and in 1850 France and Belgium established old age savings funds. Germany was first with a contributory pension plan in 1889 and this general principle was followed by Denmark in 1891 and New Zealand in 1898. Great Britain established a non-contributory system in 1908 which was financed by the government and offered aid only to old persons in actual need. This movement continued throughout the world until today there are 42 governments with a total population of 600 million persons that now offer old age security to some of their citizens. Table 3 shows the various foreign plans now in effect, with the date of establishment, the class of workers covered, the pensionable age, the contributors to the plan, and the number of persons covered.

The extent to which European

pension systems have been broadened may be indicated by the German compulsory plan which provides benefits for old age, sickness, death and disability. The present French scheme adds maternity benefits to the other four.

#### Foreign Contributory Plans

There are three general types of contributory pension plans in operation abroad: (1) Plans which include all wage earners and salaried workers in a single system; (2) Separate pension plans for wage earners and for salaried workers; (3) Plans which include special classes of workers only.

Countries in which all workers are included in a single plan number 17. Separate pension plans for wage earners and salaried workers are maintained in Austria, Belgium, Chile, Czechoslovakia, Germany and Poland. Six nations cover special classes of workers only. Austria pensions only agricultural workers, Poland covers wage earners working in former German territory only, while Lithuania protects only workers in Memel.

In 16 of the countries with contributory pension plans contributions are required from employees, employers and the state. In 15 countries only the workers and employers contribute. Contributions by the workers and the state only are required in Iceland, Sweden and Switzerland. Contributions by employers and the state are required in the Netherlands and in Spain, while in Russia only employers contribute.

Three general methods are used to determine the rate of contributions to pensioners. A flat rate for all workers, regardless of earnings or other considerations, is used in Great Britain, Iceland, Northern Ireland, Roumania, Spain, Switzerland and Uruguay. Specified rates of contribution for various wage groups are in force in Belgium (for wage earners only), Bulgaria, Czechoslovakia, France, Germany, Greece, Italy, the Netherlands, Poland, Sweden and Yugoslavia. Austria, Belgium (for salaried workers only), Chile, Hungary, Luxembourg, Portugal and Russia base contributions on percentages of actual earnings.

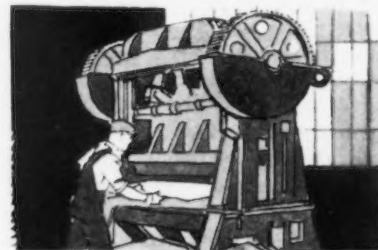
Government contributions vary widely. Some grant subsidies based on the estimated needs of the funds. Other plans call for grants

based on the pensions paid into the plan. Two governments contribute a flat sum for each worker. Another contributes flat sums for various wage groups. Chile contributes a percentage of wages to its wage earners' pension plan. Sweden pays for supplementary benefits included in its plan. Uruguay contributes receipts from special taxes.

Attainment of a specified age and the payment of a specified number of contributions are the chief requirements for pension qualifications in most foreign plans. Pensionable ages range from 50 years for salaried workers in Chile to 70 years in Portugal and Yugoslavia. Sixty-five apparently is the common retirement age.

Most countries require a certain number of contributions by employees to their pension plans before pensions are paid. Salaried employees in Austria and Germany must make 60 monthly payments and German wage earners 200 weekly contributions. Britain requires 10-cent weekly contributions and four years' continuous insurance from age 60 to 65. Because their pensions are paid in proportion to contributions made there are no such requirements in Belgium, France, the Netherlands, Spain and Sweden.

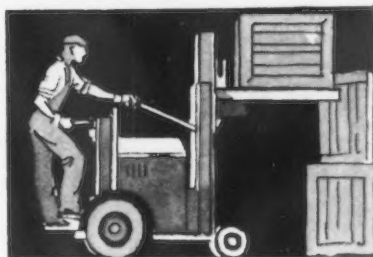
The amount of pension paid under foreign pension plans also vary widely, depending to a large extent on the economic and social conditions prevailing in each country. In Great Britain and Northern Ireland a flat rate of £26 (about \$127.40) is paid per year. Roumania and Uruguay also pay flat sums. Germany pays to wage earners a flat sum of 240 marks per year (about \$96.60) plus an annual bonus of 20 per cent of all contributions the employee has made to the fund since Jan. 1, 1924. For German salaried employees the annual grant is 480 marks (about \$193.20) plus 15 per cent of contributions since 1928. Similar plans are used in Czechoslovakia,





Greece, Hungary, Italy and Luxembourg. In Austria, Bulgaria, the Netherlands and Poland, pension payments are based on wages with a supplemental bonus for the length of time specified wages have been paid. In Belgium, Chile, France, Spain and Sweden, pension payments are based on the value of the contributions. Russia pays 50 per cent of annual monthly wages earned during the year preceding retirement. In Portugal full former annual earnings are paid for workers who join the plan before they are 45 years old.

The non-contributory type of plan is in effect in 10 foreign nations. As a general rule the ultimate requirement for a pension is



need, with maximum benefits determined by local conditions and the amount of personal income the recipient enjoys. Costs are borne in most instances by the central government, although Canada shares the expense with the provincial governments on an equal

basis, and Denmark's central government contributes 7/12ths of the total.

Retirement age is usually higher in state-financed plans than in contributory plans. With a variance ranging from 55 years in Greenland to 75 in Newfoundland, the average age is about 70 years. Claimants for pensions under non-contributory plans must always prove need, which includes an income less than a specified maximum.

*(The second and concluding section of this article, treating with the cost of present and proposed old age pension systems, will appear in the next issue.)*

## Housing Weighing 82 Tons Restored by Thermit Welding

ONE of the largest Thermit repairs in many years was completed recently at a Midwestern steel mill. The broken part was the 160-in. plate mill housing here pictured. The casting, minus all appurtenances, weighed 164,000 lb., stood 21 ft. 8½ in. high, and was 14 ft. 9 in. wide at the base and 10 ft. wide at the top.

The original fracture, which caused the housing to be removed from service, occurred in the lower portion and ran from an inside corner diagonally downward through a T-shaped section, one leg of which was 38 in. by 12 in. and the other leg 30 in. by 26 in. In preparing this fracture for welding, another crack was discovered above the first, running through a section shaped roughly like an I-beam with members 26 in. by 8 in., 26½ in. by 8 in., and 30 in. by 15 in.

Four tons of Thermit were required to make the two welds. The entire job, from the waxing of the first fracture to the pouring of the second weld, was completed in exactly one week, and at a fraction of the cost of a new housing.



Repair of this 82-ton plate mill housing is one of the largest Thermit jobs in many years. It was completed in exactly one week.



# Improvements in Production

## Gear Tooth Chamfering Machine Operates at Faster Speeds

**A**N improved single-spindle model chamfering machine, heavily and ruggedly built for high speed operation and featuring productivity up to 150 teeth per min., is now offered by W. C. Lipe, Inc., Syracuse, N. Y. The machine is shown below.

The same basic principles employed for previous models are in evidence. The gear to be chamfered is mounted on the work head by air-operated collets or by draw rod and U-washer clamping. A hardened and ground master index ring is employed for successive positioning. The cutter, automatically fed, usually straddles two teeth; the cutter is withdrawn while the gear is indexed to the next position.

Internal formed hollow mills of

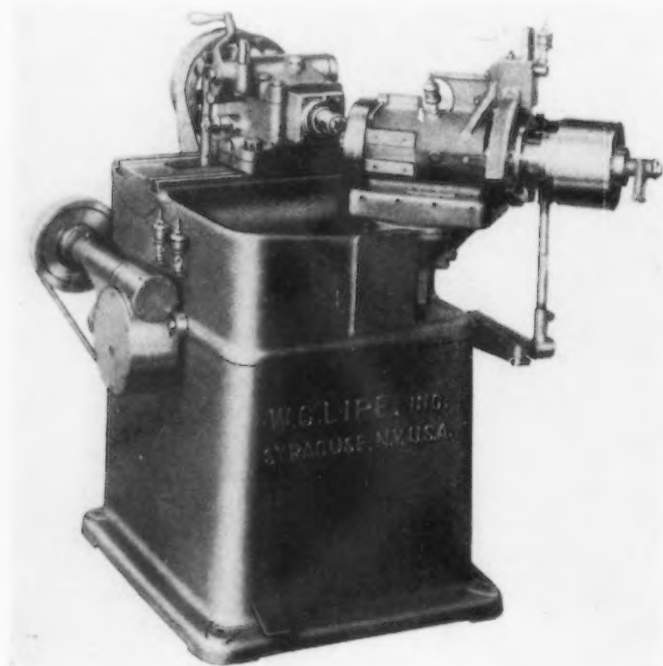
original Lipe design are used. Ball-bearing cutting spindle with inserted rack teeth, ball-bearing worm drive, spline assembly of index and cam shaft members, heavier and larger base are combined with the fully universal features of previous models. The range of work includes spur and helical gears, whether internal or external; spiral and bevel or clutch gears. Splines may be chamfered and helical or spur teeth may be burred and drilled or milled.

## Tube Marking Machine For Light Materials

**T**HE Noble & Westbrook Mfg. Co., East Hartford, Conn., has announced a heavy-duty, rapid

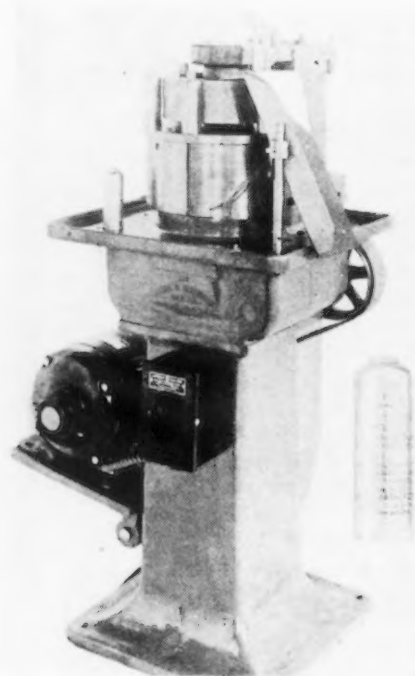
production marking machine for inscribing thin tubes up to 4 in. long and 1¼ in. diameter. The machine is pictured below.

A recent installation involves approximately 200 letters and figures on shells 0.050 in. thick at a speed of 60 tubes per min. Hardened steel mandrels are used for shell support. Both pressure and carrying dials are provided, and the central shaft is secured to the dieholder by an arm at the top. Roller bearings are employed. Unloading pins are automatically cam operated. Inclosed spur gears provide uniform timing for both pressure and carrying dials in order that their revolutions may synchronize under both marking and idle running conditions. Power is supplied by a ¾-hp. motor through worm and worm gear, operating in oil. The machine weighs 450 lb.



**Gear Tooth Chamfering Machine Operates at Faster Speeds**—Production up to 150 teeth per minute is obtainable from this single-spindle model machine which features increased rigidity.

*See text above.*



**Tube Marking Machine for Light Materials**—As many as 200 letters and figures can be successfully marked on very thin tubing by this machine.

*See text above.*

## and Shop Equipment . . .



### Special Grinder for Finishing Refrigerator Condenser Drums

**S**PECIAL machinery built recently by the Diamond Machine Co., Providence, R. I., to facilitate manufacture of household refrigerators, includes the condenser drum grinder shown in the illustration below.

The machine is designed to grind and polish light circumferential welds on the face of the condenser, thus improving the appearance of the finished unit and reducing subsequent finishing operations to a minimum. Four 14-in. diameter wheels are driven by a 20-hp. motor through V-belts. The two center wheels are on a single anti-friction bearing spindle and provision is made for equalizing the pressure between them. The end wheels are on separate anti-friction bearing spindles. These wheel spindles are mounted at the end of vertically swinging arms so that they may be raised or lowered from the work. These arms swing about the centers of the driving pulleys and are variable in length for belt adjustment.

Pressure of the wheels on the work is governed hydraulically, each arm being equipped with a hydraulic cylinder for each wheel. The cylinders receive their pressure from a common source and the pressure is uniform on all wheels regardless of their diameter. This equalized wheel pressure may be varied by the operator at will simply by turning a relief valve. This provides for uneven wheel wear, variable size wheels and compensates for the dulled condition of worn wheels; it also permits the operator to govern the depth of cut as required.

The drums are held from the inside by a pneumatically-operated expanded mechanical chuck. The holding unit is equipped to take different sizes of condenser drums, and is rotated by an electric motor through a Reeves drive that provides suitable peripheral speeds

for the particular size and material of drum and the abrasive being used. The work can be positioned beneath the grinding without disengagement of the drive. This is accomplished by the use of sliding spur gear drive.

Controls are conveniently located and are interlocked so that the machine cannot be operated without the work having been first firmly gripped by the holding fixture and properly positioned under the wheels. When the work is properly positioned, the operator presses a push button to bring the wheels in contact with the work. As the work-holding fixture makes one revolution four of the welds are ground. At the proper point these wheels automatically lift a limited

amount from the work, and the work holder stops. The work is then repositioned by lever, placing the remaining four welds in relation to the abrasive wheels. The starter button is again pushed and the operation repeated. Floor to floor time in grinding the eight welds is 35 sec.

Eclipse Counterbore Co. of Detroit has issued Catalog No. 35. It has a five-ring binder-cover and the pages are of the loose-leaf type permitting quick replacement of changes and also additions. The page size, as in former Eclipse catalogs, is 6 x 9 in. and an index is provided, enabling the reader to quickly locate the particular tool in which he is interested. The No. 35 catalog contains complete data on the new radial drive, introduced to the trade two years ago. Another new addition is the 0.001 in. adjustment variable length holder, a recent development of this company. A complete line of cemented carbide tipped turning tools, rotating tools of the particular types, is also listed. The latest development in solid hollow milling cutters with relieved internal teeth is also included in the catalog.



**Special Grinder for Finishing Refrigerator Condenser Drums**—The design provides for variable and equalized pressure on four 14-in. wheels which are mounted on spindles carried by vertically swinging arms.

*See text above.*



## Drying Machine Uses Aluminum Throughout

THE Philadelphia Drying Machinery Co., Philadelphia, is marketing a corrosion-proof drying machine which features the use of aluminum as non-corrosive metal in the fabrication of the equipment, shown at the bottom of this page.

Structural aluminum is used throughout the frame; aluminum sheets are used for all internal partitions and as inside sheets of all insulating panels. Steam coils and coil supports are of aluminum. Aluminum bolts are used in assembly. The avoidance of aluminum alloys containing copper, is specified.

## Two Boom Crane with 33-Ft. Span, 50-Ft. Lift

A CHARGING crane having the novel feature of two booms on opposite sides of the trolley so that the crane may be used to charge several different cupolas on either side of the charging floor, is being built by the Whiting Corp., Harvey, Ill. Each hoist is of 5-ton capacity. The cage is mounted on the trolley, giving the operator a clear view of all operations. This crane has a span of 33 ft., 50 ft. lift, and is equipped with a. c. motors and controllers. It also has a motor generator set with magnet takeup reel and cable, and will be used to unload pig iron and scrap as well as for charging. It is also planned to use the

magnet with a drop ball for breaking large pieces of scrap. Through the use of a single line bucket the crane will also be available for unloading coke and sand. See page 37.

## Conveyor Operation in Card Spray-Coating

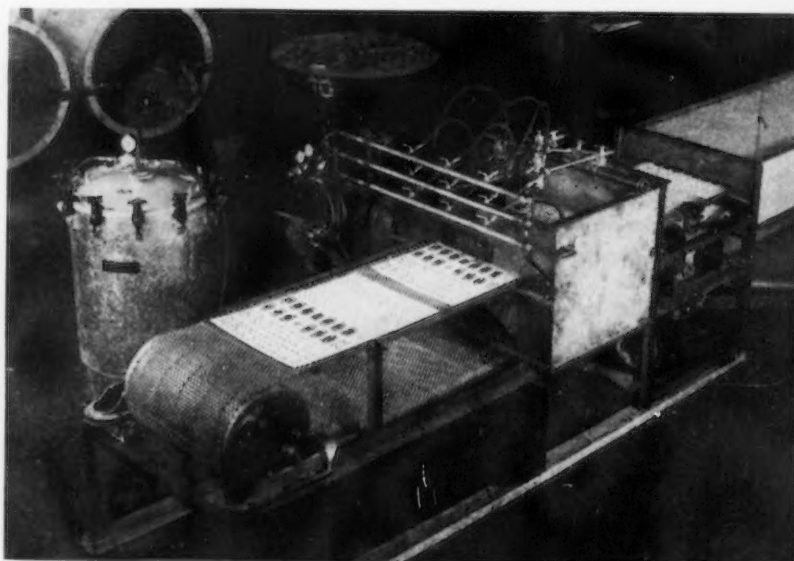
THE illustration below shows a special conveyor automatic spraying machine announced by the Binks Mfg. Co., 3106-50 Carroll Avenue, Chicago. The equipment sprays and dries large flat sheets of uncut playing cards with a glossy finish coat.

Cards are fed into the processing on an endless wire mesh conveyor belt, and travel past the three au-

tomatic guns where they are sprayed with an even gloss coat. Not shown in the illustration, is a special exhaust spray booth set over the gun chamber to collect the spray mist. The conveyor has an adjustable speed control of 16 to 48 ft. per min. and is belt driven by a ½-hp., 220-volt, 3-phase, 60-cycle motor.

Leaving the spray conveyor, the cards are ejected on to an endless canvas drying chamber belt over 50 ft. in length. The insulated drying chamber is filled with hot air from a gas heater located at the unloading end. The heater is equipped with a ¼-hp. electric motor blower. The cutting operation follows ejection from the drying chamber.

It is said that adaptations of the process are not confined to a narrow field.



### ABOVE

Variety in spray conveyor work is illustrated by this method of applying a glossy finish to playing cards.

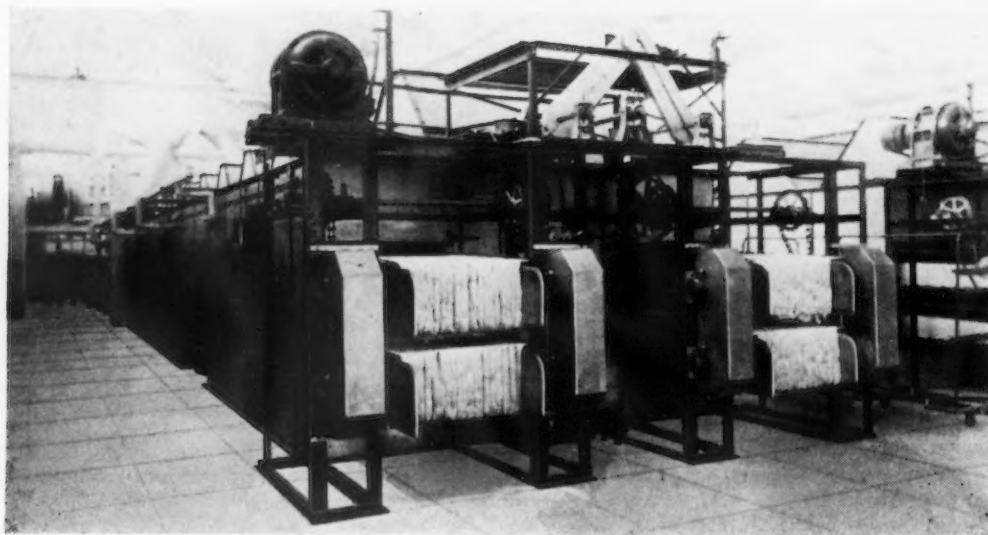
*Text above.*

### AT LEFT

Drying Machine Uses Aluminum Throughout—because of its resistance to corrosion.

*See text column 1, above.*

○ ○ ○



## Automatic Stud Welder Employs Hopper Feed

NEW resistance welding machine and equipment developed by the Thomson-Gibb Electric Welding Co., Lynn, Mass., provide a method for the assembly-production of units, on a mass production scale, which are commonly produced in cast form. Equipment illustrated below is designed for welding studs to the circumference of pipe. The operation is entirely automatic; the studs are loaded into the hoppers at the top of the machine from which they pass down into the magazines below and feed into position in the multiple indexing electrodes. Each pair of studs is attached at the same time by a series weld.

Exact alinement and spacing are controlled by the indexing fixtures and the entire operation is performed at high speed.

The welding of bosses to

fabricated stampings or similar parts is specified as within the principle of operation.

## Electrode Produces Self-Hardening Deposit

A NEW hard surfacing electrode is being offered by the Lincoln Electric Co., Cleveland, for the building up of straight carbon, low alloy or high manganese steel surfaces to resist abrasion. Applications include restoring of teeth, lips and bottoms of power shovels; lugs and treads of tractors; housings and impellers of centrifugal sand pumps; rock crushing and agricultural machinery parts and of worn gear and pinion teeth.

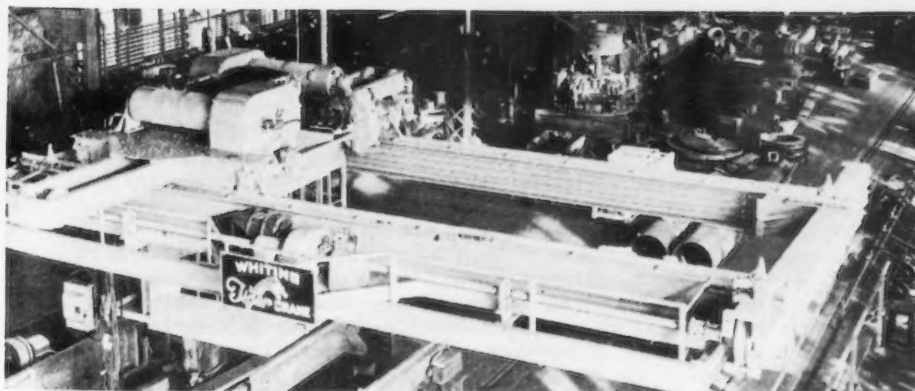
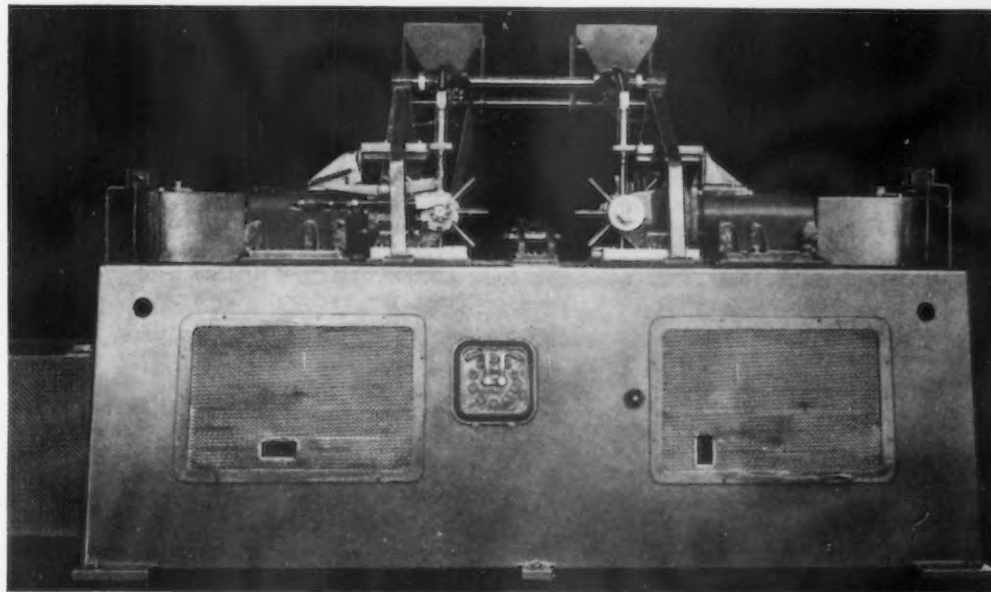
This electrode provides a self-hardening deposit of abrasion resisting alloy which surface hardens rapidly under conditions of impact and abrasion. Advantages claimed include elimination of the ten-

dency of the deposit to chip off in service. It is stated that the Abrasoweld deposit develops its maximum hardness only at the surface where it is cold worked, leaving a strong, tough core for resisting shock, and is in this respect similar to high manganese steel, except that the metal is harder as deposited and increases in hardness much more rapidly. It is stated, for example, that moderate peening will increase hardness as deposited from 20-30 Rockwell C to about 50 Rockwell C. Weld metal produced by the new electrode must be ground to shape, as it cannot be filed or machined. The deposit can be forged hot without materially altering its physical properties. Greater resistance to corrosion than high manganese steel is also claimed.

The Abrasoweld electrode is made in the 3/16-in size, 14 in. in length. It is used with reversed polarity with a current range of 125-200 amp. and 24-27 arc volts.

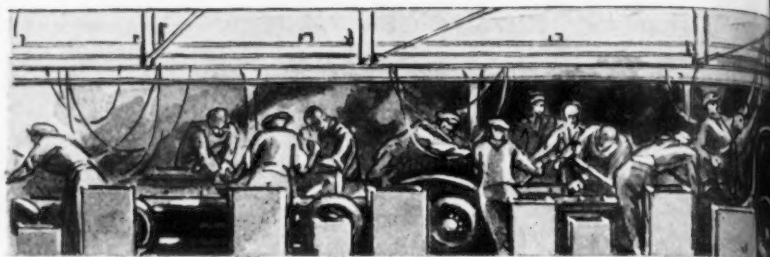
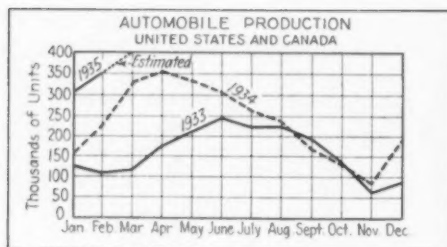
Automatic Stud Welder Employs Hopper Feed — for welding bosses as well as studs to fabricated stampings or similar materials.

See text above.



Two Boom Crane with 33-Ft. Span, 50-Ft. Lift, operates two 5-ton capacity hoists for use on two sides of a foundry floor.

See page 36, column 1.



## THIS WEEK ON THE

# March Output Estimated at 415,000 Units; April to Be Still Higher

DETROIT, March 12.

**T**HE automobile industry is continuing to function as the fountain head of the country's manufacturing activities and, unless the supply of retail orders for cars should suddenly and unexpectedly be shut off, from it will flow a substantial volume of business into steel mills and into a score of other industries during the next 30 days. The tonnage won't gush forth spectacularly, but will come out more evenly than in the last few months. There will be no further need for suppliers to cope with a torrent.

March assemblies will be even larger than anticipated a week ago, partly because Chevrolet finally has been able to unravel the production snarl which has kept it from going ahead for a number of weeks. The industry's total this month should be around 415,000 units. Added to the 355,350 units estimated for February and to 303,372 units in January, this will put the number of cars and trucks coming off the lines during the first quarter at 1,073,000 units, or 49 per cent more than in the corresponding quarter a year ago. It is a slightly higher figure than the 1,046,689 units built in the first quarter of 1930, thereby giving the current quarter the distinction of being the best for a similar period since 1929.

The second quarter gives promise of equally robust activities. It still appears that the production peak will be attained in April, but there is not likely to be any abrupt drop from the dizzy heights during May and June. Car manufacturers are more confident than they were a few weeks ago that the advent of warmer weather will bring a mighty swelling in retail sales,

despite the extraordinary trade already enjoyed this year. Notwithstanding the Gargantuan monetary and economic problems facing the country, the fact remains that people are spending their money more freely and one of the first major outlays is usually for an automobile.

### Ford's Retail Sales High

Sales figures put alongside production totals tell a powerful story. Ford's domestic output in January and February amounted to 217,689 units; during that time Ford dealers sold 166,535 units, or 76 per cent of the cars and trucks received from the factory. This left dealers with 51,154 units on hand or about seven cars each (Ford has around 7500 dealers). Since Ford has 12 passenger car models plus commercial cars and trucks and since the opening of the big selling season is near, these stocks are small.

Pontiac made 16,327 cars in February, the largest number of assemblies in a single month since 1929. Yet its dealers sold 10,732 cars, for the best February record in six years. This enabled 2350 dealers to stock for the spring trade only 5595 cars in the past month. Olds is having difficulty in keeping enough cars in dealers' hands, despite the fact that operations are at an all-time high mark.

All of the individual performances aren't as noteworthy as Ford's and Pontiac's, but there are few instances, if any, of overstocking of dealers. An examination of the records since Jan. 1 shows that the Big Three are relentlessly squeezing the independents more tightly all the time. In that period Ford accounted for 36.4 per

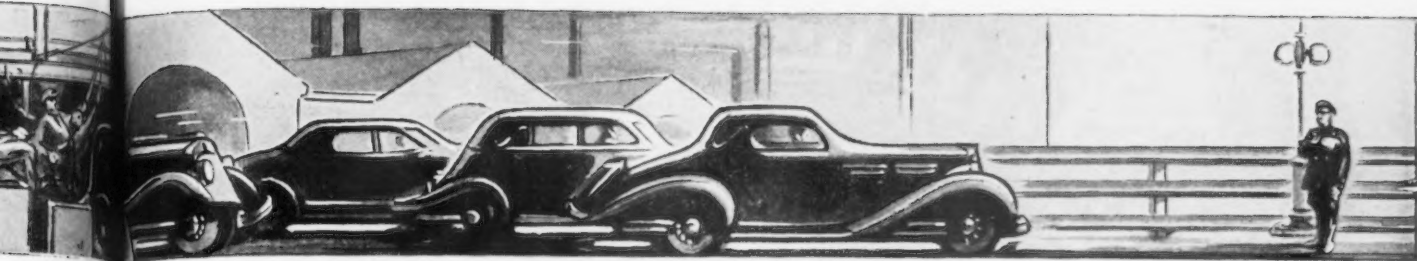
cent of total production, General Motors 33.2 per cent and Chrysler 24.3 per cent, or 93.9 per cent in the aggregate. All the independents thus manufactured only 6.1 per cent of all the cars. January registration figures already available reveal that the Big Three took 92.2 per cent of the business, as against 90.9 per cent during the entire year 1934.

### Chevrolet's Delay Is Costly

Percentage comparisons of production in January and February with last year prove that Chevrolet's delays have been profitable to Ford (up 10 points) and to Chrysler (up 3 points) and have been costly to General Motors, which has dropped 6 points. Chevrolet the middle of last week suddenly snapped up to 4000 units a day, and its assemblies this month should be over 100,000 units, whereas a week ago it seemed doubtful that its output would go much above 80,000. Troubles connected with fabrication of the turret top have done more damage this year than the tool and die strike and knee action manufacturing difficulties combined did a year ago. That is, early in March, 1934, Chevrolet had raised its production to 5000 cars a day. At the same time this year assemblies were little more than 2500 cars.

Chevrolet's failure to get going on a large scale was not a sudden development, according to reliable reports, but was anticipated as far back as November. The turret top had been incorporated in the design of 1935 Oldsmobiles, Pontiacs and Master Chevrolets, but, to the dismay of General Motors executives, it was discovered that only a limited number of the new tops could be fabricated in the early





# HE ASSEMBLY LINE

months of 1935. In the emergency, Chevrolet dealers would have Standard passenger cars, commercial cars and trucks to fall back on, whereas Olds and Pontiac dealers, if they couldn't get cars, would be compelled to twiddle their thumbs. Whereupon, so the story goes, the decision was made to furnish bodies first to Olds and Pontiac and finally to Chevrolet for its Master cars. Chevrolet, rising to the occasion, has done a good job of "plugging" the Standard. Final passenger car registration figures for January will show it ahead of Plymouth, although its dealers had practically no Masters to sell during that month.

## All-Steel Top to Be Popular

It is considered only a matter of time until the entire industry adopts the all-steel top. It is almost sure to be on the new Buick models for 1936 and also on the Standard Chevrolets. Unlike knee action wheels, which increased the cost of making a car \$12 to \$22, the turret top is said to be less expensive than the old fabric top. It has that rare combination of beauty of appearance, of added safety and of economical manufacture so seldom uncovered by the industry as a major selling feature in a single item.

Aside from General Motors, Hudson is the only company committed to the all-steel top. The Hudson job differs from the General Motors product in that it consists of two pieces of steel welded together, whereas the latter is a single stamping. This method saved an immediate investment in large presses, of course, but probably makes the fabrication of the top more expensive. Looking ahead at the possibilities of the growing use of the all-steel top, one can foresee an inevitable demand for wide sheets in greater quantities than now rolled. One also can visualize more widespread employment of large presses capable of stamping an entire top in one operation.

## BY BURNHAM FINNEY

*Detroit Editor, The Iron Age*

• • •

Among independent car makers, Hudson had shipped 26,183 cars up to March 2, or 12,000 more than in the same period of last year. In February it sold 2000 more cars than in February a year ago. It suffered a grievous loss recently in the sudden death of Aaron De Roy, its largest distributor and probably the largest automobile dealer in Detroit. Studebaker, having completed its reorganization, has reduced the delivered prices of its cars and is launching a vigorous advertising campaign. Its shipments since Jan. 1 were 25 per cent ahead of the comparable period in 1934.

## Hupp Uses Unorthodox Sales Methods

Hupmobile is resorting to unorthodox methods to sell its cars. The device, which has been described as "an adventure in profit-spreading," is the invention of Archie M. Andrews, chairman of the board for the last six months. Each Hupmobile owner is to be asked to send to the company the names of four prospective buyers and in return will receive a flameless cigarette lighter. If one of the prospects actually purchases a Hupmobile, the person who suggested his name will be placed on Hupp's payroll for one month at \$5 a week. The salesman and dealer through whom the sale would be made is to receive the same commission as always.

This stunt, at which car manufacturers with a larger number of retail outlets scoff, apparently is merely the first of a series. Early in May Hupp is to stage a "pageant of transportation." On the day of the pageant a huge banquet will be held at which speeches will be made by outstanding authorities of advanced transportation in every field—rail, water and air.

One thousand new car owners will be brought to Detroit for the occasion by means of the latest types of streamline trains and airplanes to emphasize the aerodynamic nature of modern transportation development. At the end of the ceremonies, they will drive their new cars home. A leading newspaper will publish an illustrated section devoted to the pageant and will circulate a million copies of it. As one observer remarked, "This is laying on the ballyhoo pretty thick." When informed that some other companies didn't think so much of the plan, he added, "They're only peevish because they didn't think of the idea first."

Hupp, incidentally, hasn't yet sampled all its dealers with its new cars, according to reliable reports. The reason is that it has had trouble getting bodies from Hayes Body Corp'n. at Grand Rapids, which is building all of Hupmobile's bodies at present.

## New La Salle to Be Announced

The new La Salle is scheduled for public presentation late this month. Some of the cars are coming off the lines now at the local plant. Packard, with an encouraging volume of orders on hand, is rapidly whipping production troubles in connection with its 120 job. It bought considerable steel the past week.

Ford is outselling Chevrolet in commercial cars and trucks with which the latter's dealers are well stocked. Ford has been awarded a sizable truck order by the Federal Government because it could make delivery in 10 days, despite the fact that Chevrolet's bid was understood to have been lower. Ford hasn't altered its program to make 160,000 units in March, 170,000 in April and 156,000 in May. Unless its production should be drastically curtailed, it will build well over 800,000 cars in the first half of the year, or within less than 200,000 of the minimum goal set by Henry Ford for the entire year.

# A GAGE FINISH *that* HAS NO EQUAL..

**T**HE new Sheffield Precision Lapping Process assures not only a more accurate gage, but one having a materially increased service life—that is, lower gage cost per thousand holes.

The finest grinding operation possible will leave scratches and furrows in a gage surface. It will also temper draw the surface metal to a depth of approximately from "one to two-tenths". This soft outer layer, unless completely removed by lapping, will wear very rapidly in service. Obviously the furrows left on the gage surface will be rubbed off in the first few holes gaged.

The photomicrographs, shown, illustrate the actual surface appearance of several lapped gages. Note the striking

characteristics of each in comparison with that produced by the Sheffield Precision Lapping Process as illustrated in Fig. 4.

This surface has no deep furrows. The fine lapping cuts do not run parallel to promote uneven wear. All temper drawn metal has been removed to present a surface of proper hardness and density.

The chrome plated Sheffield gage has also another exclusive advantage—that of end reinforcement. The chromium plating on the Sheffield gage does not chip and peel, as it does with unanchored shells.

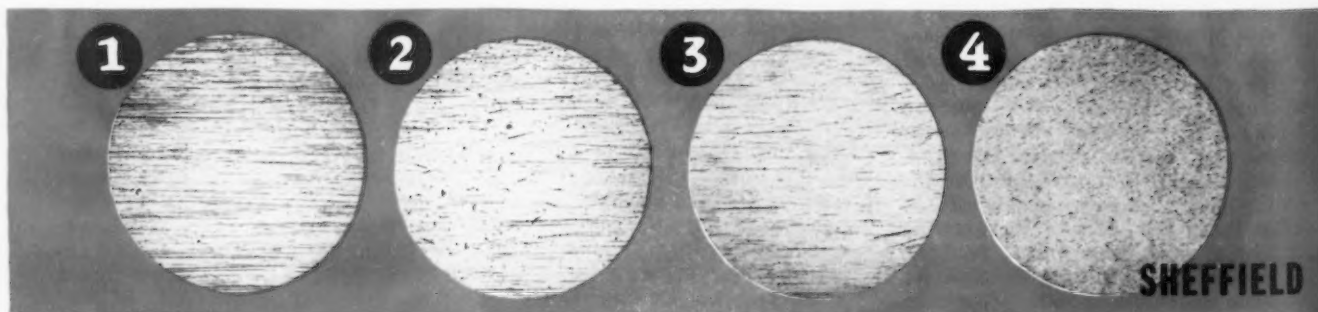
Write for complete information on the Sheffield Plug Gages. They definitely reduce the cost per gaged hole.



Conventional plated gage after finishing.

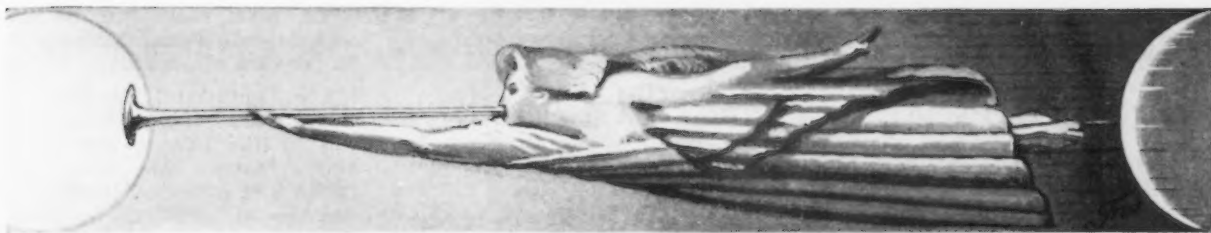


New end lock protection which locks entire plated shell in place and prevents stripping.



## SHEFFIELD GAGE CORPORATION

*Dayton, Ohio*  
U. S. A.



## NEWS OF THE WEEK

### Daily Steel Ingot Output Increased 8.1 Per Cent Over January Average

WHILE total production of steel ingots during February amounted to 2,742,125 gross tons, according to the American Iron and Steel Institute, and reflected a slight decline from the 2,834,170 tons produced in January, the daily rate of output rose 8.1 per cent. Working only 24 days last month, the industry produced 114,255 tons of steel daily, compared with 104,255 tons daily in the preceding month.

February activity engaged the country's steel-making capacity at 51.61 per cent, compared with a re-

vised figure of 41.42 per cent in January and with 41.31 per cent in February, 1934.

### Cast Metals to Be Shown at Chicago

AN exhibit of cast metals will be one of the features of a meeting to be held March 18 at Chicago, for a discussion of "Engineering Uses of Modern Cast Metals." This meeting, which will be

held in the auditorium of the Engineering Building, at 7:30 p.m., is being sponsored by the Chicago section of the American Foundrymen's Association, Western Society of Engineers and the Chicago section of the American Society of Mechanical Engineers. The exhibit will open at 6:45 p.m. for inspection before the meeting.

Steel, malleable iron and gray iron castings will be discussed from the standpoint of advancement made in the engineering properties and uses of these three metals. H. Bornstein, chief chemist and metallurgist, Deere & Co., Moline, Ill., will talk on gray iron. Developments in malleable iron use will be treated by D. P. Forbes, president and general manager, Gunite Foundries Corp., Rockford, Ill., and steel castings will be discussed by A. N. Connarroe, metallurgist, National Malleable & Steel Castings Co., Melrose Park, Ill. H. F. Allen, Link-Belt Co., Chicago, will be chairman of the meeting.

#### MONTHLY PRODUCTION OF OPEN-HEARTH AND BESSEMER STEEL INGOTS (Gross Tons)

Reported by Companies Which Made 99.32 Per Cent of Open-Hearth and 100 Per Cent of Bessemer Ingot Production in 1933

1934	Open-Hearth	Bessemer	Calculated Output All Companies		No. of Working Days	Per Cent Operation†
			Monthly	Daily		
January	1,786,467	172,489	1,970,979*	72,999*	27	33.15*
February	1,993,638	175,873	2,182,826*	90,951*	24	41.31*
March	2,540,143	203,904	2,760,888*	102,255*	27	46.44*
April	2,622,372	257,482	2,897,529*	115,901*	25	52.64*
May	3,000,624	331,620	3,352,695*	124,174*	27	56.39*
June	2,714,983	282,592	3,015,972	115,999	26	52.68
July	1,343,732	119,869	1,472,584	58,903	25	26.75
August	1,245,445	109,598	1,363,359	50,495	27	22.93
September	1,126,415	117,580	1,251,630	50,065	25	22.74
October	1,325,225	127,789	1,461,932	54,146	27	24.59
November	1,447,297	132,059	1,589,049	67,117	26	27.76
December	1,797,830	131,456	1,941,127	77,645	25	35.26
Total	22,944,171	2,162,311	25,260,570	81,224	311	36.89
1935						
January	2,576,671	239,858	2,834,170	104,969	27	47.42
February	2,500,062	224,336	2,742,125	114,255	24	51.61
Two months	5,076,733	464,194	5,576,295	109,339	51	49.66

\*Revised.

†The figures of "per cent of operation" are based on the annual capacity as of Dec. 31, 1933, of 68,478,813 gross tons for open-hearth and Bessemer steel ingots.

### Opponents of Wagner Bill Mobilize

THE steel industry and the metal-working industries in general are preparing to take action in opposition to the Wagner labor disputes bill. Employers in these lines will most certainly file briefs outlining their views on the proposed legislation and some of them may ask to be heard in person. Employee representatives are also considering what course of action they should take, with the probability that some of them will ask for a hearing. Testimony of employee representatives before the Senate Commission of Education and Labor was a feature of the hearings on the original Wagner bill last year.



## February Steel Corporation Shipments Increase Despite Shortness of Month

**F**EBRUARY steel shipments of the United States Steel Corp. rose to 583,137 tons from 534,055 tons in January, despite the fact that there were only 24 working days last month, compared with 27 in January. In February, 1934, only 385,500 tons of steel was shipped. The February, 1935,

showing was the best for that month since 1931.

The February movement was sufficient to engage the corporation's finishing capacity of 19,261,900 tons at 39.2 per cent of capacity, compared with 31.9 per cent in the preceding month.

MONTHLY SHIPMENTS OF STEEL PRODUCTS BY UNITED STATES STEEL CORP.

Month				1933		1934		1935	
	1930	1931	1932	Ship- ments	Per Cent of Ca- pacity	Ship- ments	Per Cent of Ca- pacity	Ship- ments	Per Cent of Ca- pacity
January	1,104,168	800,031	426,271	285,138	17.7	331,777	19.8	534,055	31.9
February	1,141,912	762,522	413,001	275,929	18.5	385,500	26.3	583,137	39.2
March	1,240,171	907,251	388,579	256,793	15.3	588,209	36.6	.....	...
April	1,188,456	878,558	395,091	335,321	21.6	643,009	41.5	.....	...
May	1,203,916	764,178	338,202	455,302	27.1	745,063	44.4	.....	...
June	984,739	653,104	324,746	603,937	37.4	985,337	61.2	.....	...
July	946,745	593,900	272,448	701,322	45.1	369,938	23.0	.....	...
August	947,402	573,372	291,688	668,155	39.8	378,023	23.1	.....	...
September	867,282	486,928	316,019	575,161	35.6	370,306	23.0	.....	...
October	784,648	476,032	310,007	572,897	35.5	343,962	20.6	.....	...
November	676,016	435,697	275,594	430,358	26.7	366,119	22.9	.....	...
December	579,098	351,211	227,576	600,639	38.7	418,630	26.1	.....	...
Plus yearly adjustment.	(40,259)	(6,040)	(5,160)	(44,283)	...	.....	...	.....	...
Total for year	11,624,294	7,676,744	3,974,062	5,805,235	30.1	5,905,966	30.7	.....	...

## British Pig Iron Trade Improving With Steel Demand Also Better

**L**ONDON, ENGLAND, March 11 (By Cable).—Fresh business in pig iron is more plentiful. Output is being absorbed and the outlook is considered favorable.

The decision regarding higher duties on semi-finished steel is still anticipated about the end of March. In the meantime, imports have been substantially reduced, and domestic purchases have in-

creased. Output now exceeds 1934 averages.

Home buying of finished steel is substantial. Plate mills are busy, but production is exceeding new bookings. Demand for railroad and structural material is steady and three months' employment is assured. Exports are active and a large cargo was recently shipped to Argentina. Sheets are quiet, particularly for exports.

### British Prices, f.o.b. United Kingdom Ports

Per Gross Ton

Ferromanganese, export	£9
Billets, open-hearth	£5 10s. to £5 15s.
Tin plate, per base box	*18s. 2d. to 19s.
Steel bars, open-hearth	£7 17½s.
Beams, open-hearth	£7 7½s.
Channels, open-hearth	£7 12½s.
Angles, open-hearth	£7 7½s.
Black sheets, No. 24 gage	£9 5s.
Galvanized sheets, No. 24 gage	£11 5s.

\*To June 1; 18s. 5d. to 19s. 3d. thereafter.

### Official Continental Prices, f.o.b. Continental Ports

Per Metric Ton, Gold £

Current dollar equivalent is ascertained by multiplying gold pound price by 124.14 to obtain franc equivalent and then converting at present rate of dollar-franc exchange.

Billets, Thomas	£2 7s.
Wire rods, No. 5	£4 10s.
B.W.G.	£3 5s.
Steel bars, merchant	£2 8s.
Sheet bars	£4
Plate, ¼ in. and up	£4 2s. 6d.
Plate, 3/16 in. and 5 mm.	£4 7s. 6d.
Sheets, ¼ in.	£3 2s. 6d.
Beams, Thomas	£3 2s. 6d.
Angles (Basic)	£3 2s. 6d.
Hoops and strip base	£4 2s. 6d.
Wire, plain, No. 8	£5 7s. 6d.
Wire nails	£5 15s.
Wire, barbed, 4-pt. No. 10	£8 15s.
B.W.G.	£8 15s.

Tin plate demand is moderate with exports small. Output is at 50 per cent of capacity.

The Continental iron and steel markets are quiet, pending the result of the Cannes negotiations, and operations are being maintained with difficulty. English and Continental questions on United Kingdom import quotas are unsettled and further meetings will be held in Brussels in two weeks. Business in wire rods to the United Kingdom is moderate and demand from Argentina and Scandinavia is fair. The Far East and British India are placing some orders, but the business is necessitating considerable concessions in view of competition.

The International Rail Makers Association has prolonged quotas until July 1, 1935. Germany has booked a large share of the Dutch order for 15,000 tons of ship plates.

## Tool and Die Group Names New Officers

**T**HE annual convention of the Special Tool, Die and Machine Shop Institute, including the meeting of the code authority of the industry, was held recently at the Hotel Statler, Cleveland.

Officers elected by the institute are as follows: president, F. S. Blackall, Jr., president-treasurer, Taft-Peirce Mfg. Co., Woonsocket, R. I.; vice-president, H. A. Stoddard, Interstate Mechanical Laboratories, 521 West Fifty-seventh Street, New York; treasurer, G. A. Barth, Barth Stamping & Mfg. Co., 3815 West Thirty-fourth Street, Cleveland; and secretary, George J. Huebner, Special Tool, Die and Machine Shop Institute, 1225 Guarantee Title Building, Cleveland.

Roy T. Wise, former executive secretary of the code authority, resigned to become affiliated with the Ex-Cell-O Aircraft & Tool Corp., Detroit. In consideration for his excellent service he was elected to the chairmanship. Mr. Huebner, appointed to succeed Mr. Wise, was recently secretary and general manager of the Automotive Tool and Die Manufacturers Association, Detroit.

The Worthington Pump & Machinery Corp. has purchased a new 1000-lb. Detroit rocking electric furnace for use in its Buffalo Works foundry. This furnace is required for the making of high quality ferrous castings for Diesel engines and compressors. Use of the furnace will permit Worthington to utilize its own shop borings and foundry scrap.

## Exports of Iron and Steel Show Large Increase Over January, 1934—Imports Unchanged

WASHINGTON, March 12.—Exports of iron and steel products from the United States during January, 1935, totaled 262,740 gross tons, compared with 178,023 gross tons in January, 1934, an increase of 84,717 tons, according to the Iron and Steel Division, Department of Commerce.

Iron and steel scrap was first—ranking in volume among the items entering into the iron and steel export trade during the month and totaled 179,630 gross tons, compared with 87,272 gross tons in January, 1934, statistics show.

The leading markets for American iron and steel products during the month in order of importance

of tonnage were: Japan, 124,181; United Kingdom, 21,935; Italy, 20,794; Canada, 17,267; Poland and Danzig, 9668; Mexico, 9040; China, 6928, and Kwantung, 5160.

Imports of iron and steel products into the United States during the month totaled 22,784 gross tons, against 22,653 gross tons in January, 1934, according to the official statistics.

### Imports of Iron and Steel Products into the United States

(In Gross Tons)

	January	
	1935	1934
Pig iron.....	2,033	11,886
Sponge iron.....	257	45
Ferromanganese and spiegeleisen <sup>1</sup> .....	2,630	1,413
Ferrochrome <sup>2</sup> .....	213	1
Ferrosilicon <sup>3</sup> .....	1	35
Other ferroalloys <sup>4</sup> .....	2,415	1,160
Scrap.....	7,549	14,540
Pig iron, ferroalloys and scrap.....	7,549	14,540
Steel ingots, blooms, etc.....	99	54
Wire rods.....	775	747
Semi-finished steel....	874	801
Concrete reinforcement bars.....	109	46
Hollow steel bars....	50	61
Merchant steel bars..	2,210	1,033
Iron slabs.....	58	46
Boiler and other plate	10	17
Sheets, skelp, and saw plate.....	321	488
Tin plate.....	4	3
Structural shapes....	3,569	1,030
Rails and rail fasten- ings.....	211	190
Welded pipe.....	21	255
Other pipe.....	1,669	527
Barbed wire.....	1,684	1,549
Round iron and steel wire.....	415	258
Telegraph and tele- phone wire.....	....	1
Flat wire and strip steel.....	112	49
Wire rope and strand	193	145
Other wire.....	146	2
Cotton ties.....	80	....
Other hoops and bands	2,207	823
Nails, tacks, and staples.....	993	605
Bolts, nuts, and rivets	36	28
Horse and mule shoes	82	26
Rolled and finished steel.....	14,180	7,183
Malleable iron pipe fit- tings <sup>5</sup> .....	37	....
Cast iron pipe and fit- tings.....	....	2
Castings and forgings	144	127
Total.....	22,784	22,653

<sup>1</sup> Manganese content.

<sup>2</sup> Chrome content.

<sup>3</sup> Silicon content.

<sup>4</sup> Alloy content.

<sup>5</sup> New class. No comparable figures for 1934 and previous years.

### Exports of Iron and Steel from the United States

(In Gross Tons)

	January	
	1935	1934
Pig iron.....	261	326
Ferromanganese.....	3	....
Iron and steel scrap..	179,630	*87,272
Tin plate scrap.....	4,209	....
Waste-waste tin plate	2,273	....
Pig iron, ferroalloys and scrap.....	186,376	87,598
Ingots, blooms, billets, sheet bars.....	3,221	455
Skelp.....	373	819
Wire rods.....	3,279	7,011
Semi-finished steel....	6,873	8,285
Steel bars.....	4,745	3,316
Alloy steel bars.....	154	388
Iron bars.....	233	112
Plates, iron and steel	2,019	2,487
Sheets, galvanized steel.....	5,324	4,816
Sheets, galvanized iron.....	99	107
Sheets, black steel....	12,166	5,748
Sheets, black iron....	401	142
Hoops, bands, strip steel.....	2,772	2,901
Tin plate and taggers tin.....	14,954	**21,118
Terne plate (including long ternes).....	282	....
Structural shapes, plain material.....	1,663	1,143
Structural material, fabricated.....	1,711	2,084
Tanks, steel.....	774	480
Steel rails.....	1,000	12,267
Rail fastenings, switches, spikes, etc.	715	3,832
Boiler tubes.....	832	498
Casing and oil line pipe.....	4,058	5,786
Pipe, black and gal- vanized, welded steel	4,195	3,656
Pipe, black and gal- vanized, welded iron	144	144
Plain wire.....	3,220	3,518
Barbed wire and woven wire fencing.	2,724	2,335
Wire cloth and screen- ing.....	100	36
Wire rope.....	231	284
Wire nails.....	783	866
Other nails and tacks	349	308
Other wire and manu- factures.....	365	470
Bolts, nuts, rivets and washers, except track	438	424
Other finished steel..	72	179
Rolled and finished steel.....	66,523	79,445
Cast iron pipe and fit- tings.....	818	1,090
Malleable iron screwed fittings.....	269	335
Car wheels and axles.	489	306
Iron castings.....	849	613
Steel castings.....	116	93
Forgings.....	427	258
Castings and forgings	2,968	2,695
Total.....	262,740	178,023

\*Includes tin plate scrap and waste-waste tin plate.

\*\*Includes terne plate.

### United States Imports of Pig Iron by Countries of Origin

(In Gross Tons)

	January	
	1935	1934
United Kingdom....	50	....
British India.....	....	4,150
Germany.....	....	6,681
Netherlands.....	929	1,055
Canada.....	....	....
France.....	....	....
Belgium.....	....	....
Norway.....	....	....
Sweden.....	200	....
All others.....	854	....
Total.....	2,033	11,886

### Sources of American Imports of Iron and Manganese Ores

(In Gross Tons)

	January		Manga- nese Con- centrates, 35 Per Cent or Over	
	Iron Ore			
	1935	1934	1935	1934
Canada.....	....	....	....	426
Cuba.....	22,009	....	3,180	....
Chile.....	43,600	65,942	160	....
Spain.....	....	....	....	....
Norway.....	7,092	....	....	....
Sweden.....	....	....	....	....
French Africa.....	....	....	....	....
Russia.....	8,150	16,910	6,564	798
India.....	....	....	186	648
Brazil.....	....	....	....	1,077
West Africa.....	....	....	6,038	4,207
Other coun- tries.....	5,564	6,406	....	....
Total ..	86,406	89,258	16,128	7,156

## Code Officials Visit West Coast Foundrymen

THE four West Coast chapters of the Gray Iron Founders Society, Inc., located at Seattle, Portland, San Francisco and Los Angeles, were visited recently by F. R. Hoadley, chairman of the code authority for the gray iron foundry industry, and H. M. Halsted, Jr., executive vice-president, for the purposes of explaining the working of the code and the activities of the national organization. Meetings were held in the cities mentioned and local problems investigated and discussed.

Following are the district directors and chapter chairmen on the West Coast: District 1-A: director, R. E. Kucher, Olympic Foundry Co., Seattle; chairman of Pacific Northwest chapter, D. F. Olsen, Atlas Foundry & Machine Co., Tacoma, Wash.; chairman of Oregon chapter, J. B. Stokes, Northwest Stove Works, Portland; District 1-B: director, A. J. Muhl- bach, Vernon Foundry Co., Holly- dale, Cal.; chairman of Northern California chapter, S. D. Russell, Phoenix Iron Works, Oakland, Cal.; chairman of southern Cali- fornia chapter, Wendell Kinney, Kinney Iron Works, Los Angeles.

# Steel Corporation Deficit Reduced In 1934 — Bethlehem Had Small Profit

THE United States Steel Corp., in the year ended Dec. 31, 1934, had a net deficit before preferred dividends of \$21,667,780, according to the pamphlet report just issued. In the preceding year, the corresponding deficit was \$36,-

501,123, while in 1932, the corporation lost \$71,175,705, a total of \$129,344,608 in the three years, or only slightly more than the \$126,-637,979 charged to depletion, depreciation and obsolescence during the period.

The corporation's total earnings last year were \$35,218,359, compared with \$17,991,273 in the preceding year and with only \$12,729,566, in 1932. Interest charges have been about the same in the last two years, as have overhead charges on the corporation's iron mining properties, and dividends at the rate of 2 per cent on preferred stock were identical at \$7,205,622. Thus the deficit charged to surplus account in 1934 was \$28,873,402 in 1934, compared with \$43,706,745 in the preceding year.

According to the report, "the improvement in 1934 was due in part to an increase in shipments of finished products of about 100,000 tons, reductions in costs arising from larger operations and the cumulative effect of changes in methods and practices instituted in recent years and a moderate average increase in selling prices."

"Total production of rolled and finished steel products during the year," the report continued, "amounted to 6,004,585 tons, or 31 per cent of capacity. In 1933 corresponding production was 5,536,322 tons, or 29 per cent of capacity. Shipments of finished steel products during 1934 amounted to 5,905,966 tons, or 30.6 per cent of capacity, compared with shipments in 1933 of 5,805,235 tons, or 30.1 per cent of capacity. The trend of business during 1934 was variable. In the first quarter operations reached 29 per cent of capacity of finished steel products, in the second quarter 48 per cent, an average for the first half of 38.6 per cent; but for the second half of the year the average was only 23.5 per cent.

"The Lake Superior district iron mining properties and Great Lakes transportation facilities, while operated during 1934 to an extent somewhat in excess of that for 1933, averaged less than half of their normal capacity. As a result, there was continued the plan inaugurated in 1932 of charging direct to profit and loss account a portion of the overhead expenses applicable to such of the properties and facilities as were not operated. This amount aggregated \$7,805,943, of which \$6,371,412 represented taxes.

"The average prices received for steel products sold during the year 1934 were approximately 11 per cent in excess of those received in 1933 in respect of domestic shipments, and for export shipments about 7 per cent, calculated in both cases on basis of the same relative tonnages of the respective products in both years.

"The number of employees given work increased in the year 1934 by 10 per cent to a total of 189,881,

## Shipments of United States Steel Corp. Subsidiaries in 1934 and 1933

Domestic Shipments		1934, Tons	1933, Tons
Rolled and finished steel products.....		5,391,791	5,405,801
Pig iron, ingots, ferro and scrap.....		158,047	174,570
Coal, coke, iron ore and limestone.....		2,261,826	1,830,994
Sundry materials and by-products.....		160,035	152,726
Total tons all kinds of materials, except cement...		7,971,699	7,564,091
Portland cement, bbl.....		7,825,363	6,726,598
Export Shipments			
Rolled and finished steel products.....		514,175	399,434
Pig iron, ferro and scrap.....		7,546	512
Limestone.....		9,193	.....
Sundry materials and by-products.....		56,453	25,447
Total tons all kinds of materials, except cement...		587,367	425,393
Portland cement, bbl.....		146,294	89,356
Aggregate tonnage of rolled and finished steel products shipped to both domestic and export trade.....		5,905,966	5,805,235

## Production of United States Steel Corp. Subsidiaries in 1934 and 1933

	1934, Tons	1933, Tons
Ores—iron, manganese and zinc.....	10,074,431	8,345,767
Limestone, dolomite, fluorspar and cement rock.....	6,043,323	5,410,752
Coal.....	11,724,183	10,227,230
Coke.....	5,382,345	4,879,785
Pig iron, ferro and spiegel.....	5,512,805	5,026,209
Steel ingots and castings.....	8,660,309	8,046,995
Rolled and finished steel products for sale.....	6,004,585	5,536,322
Portland cement, bbl.....	7,260,600	6,957,100

## Steel Corporation Employment Reached Peak in June

The low rate of operations during the year required the continuance of the plan, adopted in 1930, of alternating employees so as to spread the available work among the maximum number of employees. This permitted giving approximately the same average employment to 10 per cent more men than for the previous year. The following table shows statistical data relating to the total pay roll, number of employees, average hourly earnings, etc., for the year.

Quarter Ending	Actual Number of Employees Working	Total Pay Roll	Average Number of Hr. Worked per Employee		Average Earnings per Employee per Hr. (Cents)
			Per Month	Per Week	
March 31.....	187,415	\$49,050,124	132.2	30.8	66
June 30.....	202,144	65,094,141	150.8	34.8	71
Sept. 30.....	193,715	49,781,613	118.5	27.1	72
Dec. 31.....	176,171	46,577,655	121.0	27.6	73
Year, 1934.....	189,881	\$210,503,533	131.0	30.1	70
Year, 1933.....	172,577	163,149,503	132.2	30.4	59
Increase.....	17,304	\$47,354,030	1.2*	0.3*	11

\*Decrease.

The total pay roll for the years 1934 and 1933, together with a division between operating and construction work was as follows:

	1934	1933
In operations and production.....	\$207,564,103	\$160,746,223
In construction work.....	2,939,430	2,403,280
Total.....	\$210,503,533	\$163,149,503



# Inventories of United States Steel Corp'n. Subsidiaries

	Dec. 31, 1934	Dec. 31, 1933
Ores—iron, manganese and zinc.....	\$82,279,996	\$81,817,322
Limestone, fluxes and refractories.....	3,736,473	3,878,758
Coal, coke and other fuel.....	5,435,325	6,887,636
Pig iron, scrap, ferro and spiegel.....	23,580,100	25,757,550
Pig tin, copper, lead, zinc, nickel, aluminum, dross and skimmings.....	7,682,785	9,906,834
Rolls, molds, stools, annealing boxes, etc.....	13,607,699	13,685,789
Ingot—steel.....	1,403,098	1,278,532
Blooms, billets, slabs, sheet and tin plate bars, wire rods, skelp, etc.....	15,568,299	16,888,321
Finished products at plants.....	34,415,684	29,910,878
Finished products in domestic warehouses and on consignment.....	21,748,292	19,966,198
Finished products in foreign warehouses.....	265,674	334,009
Manufacturing supplies, stores and sundry items not otherwise classified.....	24,066,182	24,258,472
Mining supplies and stores (for ore and coal properties).....	2,063,591	2,062,249
Transportation companies' supplies and stores.....	3,660,632	3,879,686
Merchandise of supply companies.....	1,067,324	972,686
Inventories at plants, shops, warehouses and distributing stores of Oil Well Supply Co.....	5,956,085	6,122,642
Material, labor and expense locked up in uncompleted bridge, structural and other contract work.....	\$22,497,978	
Less bills rendered on account.....	13,398,057	
	9,099,921	2,742,201
Material in transit.....	1,722,495	1,981,270
Total.....	\$257,359,655	\$252,331,033

while the payroll increased almost one-third from an aggregate of \$163,149,503 to \$210,503,533. This increase in total payroll arose largely from the increases in wage and salary rates which were made on July 16, 1933, in conjunction with adoption of the code of fair competition, and from further increases effective April 1, 1934. This latter increase equaled 10 per cent to the wage earners of most of the subsidiaries and to salaried employees receiving not in excess of \$3,000 per year. In the case of the wage employees of the subsidiary coal companies, the increase in rates was considerably greater than 10 per cent. The average earnings per employee per hour in 1934 were 70c., an increase of 15.5 per cent compared with the average rate paid in 1933."

## Volume of Business Larger

The total value of business transacted by all subsidiary companies during 1934 amounted to \$591,609,497, compared with \$524,968,768 in 1933. Of the 1934 total, \$354,124,236 represented domestic sales to outside users; \$37,244,437, export sales; \$135,868,278, intercompany sales between subsidiaries for further conversion and resale; \$52,647,414, gross earnings of transportation companies, and \$11,725,132, earnings and receipts by "miscellaneous" companies. Domestic sales in 1933 amounted to \$322,188,709, export sales to \$26,142,912, intercompany transactions to \$118,917,647, transportation earnings to \$47,793,577 and miscellaneous earnings to \$9,925,923.

The total expended and appropriated from earnings for maintenance, depletion, depreciation and obsolescence of investment in tangible property in 1934 was \$97,483,821, of which \$51,102,743 was for ordinary repairs and maintenance, \$817,277 for blast furnace and coke oven relinings, \$11,871 for extraordinary replacements and \$45,551,930 appropriated from earnings for exhaustion of natural resources and plant deterioration. In 1933, only \$38,415,539 was expended for ordinary repairs and maintenance, \$791,208 for blast furnace and coke oven relinings, \$5,166 for extraordinary replacements and \$44,542,274 for mineral exhaustion and plant deterioration for a total of \$83,754,187.

"The subsidiary companies," the report stated, "are at present engaged in making a detailed analysis of their net investment in depreciable property which will involve an adjustment of allowances provided for general depreciation during past years. This analysis will be completed some time during 1935. It is impossible at this time to determine what the approximate amount of this adjustment may be. Therefore, no allowance for same is reflected in the accounts at December 31, 1934. Any consideration of net property investment and surplus accounts shown in the report should accordingly be made subject to final determination as indicated."

Taxes increased to \$35,780,384 from \$31,709,992 in 1933, the largest gain having been in Federal

income, excise and miscellaneous taxes.

## Inventories Increased

The aggregate amount of inventories at the close of the year, valued at the lower of cost or market price applicable under conditions pertaining to the stocks, was \$257,359,655 compared with \$252,331,033 at the close of the preceding year, an increase of \$5,028,622 during the year. At Dec. 31, 1934, write-downs in inventory values were made to reflect above basis of valuation, to the aggregate amount of \$1,128,788, of which \$412,199 was provided from previously established reserves and \$716,589 was charged against a special reserve provided during the year from current operations.

A comparative statement of value of inventory materials and supplies on hand is shown in the accompanying table. Production and shipment figures are also shown in tabular form.

## Bethlehem Had First Annual Net Profit Since 1931

A 1934 net income of \$550,571 was reported by Bethlehem Steel Corp'n., in its annual pamphlet report. This is the first annual net income since 1931. The total income of the corporation for 1934, after deducting all charges except depletion and depreciation, was \$14,330,210, as compared with \$4,770,533 in the preceding year. After deducting provisions for depletion and depreciation of \$13,779,639, there was a net income of \$550,571 for 1934, as compared with a deficit of \$8,735,723 for the preceding year.

The net billed value of products shipped and of other classes of business done by the corporation during the year, was \$168,207,394, compared with \$120,944,984 during the preceding year. The estimated net amount of business booked during the year by the corporation aggregated \$157,340,326, as compared with \$158,060,796 in 1933. The estimated value of the unfilled orders on hand Dec. 31, 1934, amounted to \$56,817,681, as compared with \$67,684,749 on Dec. 31, 1933.

Operations of the steel plants of the subsidiary companies for the year averaged 34.9 per cent of their rated steel capacity, compared with 28.0 per cent in 1933. The daily average number of employees working during the year, excluding Saturdays, Sundays and holidays, was 44,430 as compared with 33,504 in 1933. On April 1, 1934, there was a general increase of approximately 10 per cent in the rates of wages in the steel plants. The average earnings per hour

during 1934 of the employees of the corporation in the United States, exclusive of the administrative and selling forces, was 67.4c., as compared with an average of 55.4c. per hr. during 1933.

Notwithstanding the above-mentioned increases in rates of wages, the earnings of many employees were small due to the low rate of operations in 1934, and the corporation continued its policy of making contributions to various relief funds and deferring the collection of rents from employees living in houses owned by the subsidiary companies and of interest on mortgages held by the corporation on employees' houses, where circum-

stances appeared to warrant so doing.

During 1934, \$934,829 was paid to sick or disabled employees, or to dependents of deceased employees, under the Relief Plan. Such payments were made from funds provided in 1934 and prior years through contributions made by the employees.

The number of stockholders of Bethlehem Steel Corporation at the end of the year was 84,896, of whom 3530 held both Preferred and Common Stock. The number of holders of the Preferred Stock was 33,721 and of the Common Stock was 54,705.

The report is signed by Charles M. Schwab, Chairman of the Board of Directors, and Eugene G. Grace, President.

### National Profits Large

**N**ATIONAL STEEL CORPN. had 1934 net earnings of \$6,050,721, equal to \$2.80 a share for the capital stock outstanding. Net profit in 1933 amounted to \$2,812,407, or \$1.30 a share. Total wages paid last year, according to the report, were \$22,603,691, compared with \$18,337,540 in 1933. Working capital of the corporation was increased \$6,168,062 during 1934, having been \$33,932,493 on Dec. 31.

## Guffey Coal Nationalization Bill Likely To Be Killed on Floor of Senate

**W**ASHINGTON, March 12.—The Guffey coal bill, under which the mines of the country could be nationalized, will be killed on the floor of the Senate, in the opinion of those who have followed it closely. Hearings on the measure, begun Feb. 19, came to an end March 6, and the bill is now under consideration by a subcommittee of the Senate Committee on Interstate Commerce.

Steel interests have filed briefs strongly opposing the measure, pointing out that there is no logical reason why captive coal mines should come within its provisions. Emphasis was laid on the fact that steel manufacturers use all the coal they produce and that their mines are not operated competitively with commercial mines. Contention is also made by the steel interests that the tax provision in the measure is unlawful, a point which is supported by court decisions. It is also brought out that steel company-owned mines do not operate under a code, but do pay wages equal to or above those paid by commercial mines. Among steel interests filing briefs were the United States Steel Corp., the Bethlehem Steel Corp., the Jones & Laughlin Steel Corp., the Republic Steel Corp., the Youngstown Sheet & Tube Co., the Crucible Steel Co. of America, the Weirton Steel Co., and the Wheeling Steel Corp.

The United Mine Workers, supporting the measure, insisted that it include captive mines. The coal industry itself was divided.

The bill is held to be so far-reaching that doubt exists that it will be given Administration sup-

port at this session, if at all. Also it is claimed that Administration support of the bill would be a tacit admission that the coal code is not working satisfactorily, while the United Mine Workers claim that the code has virtually broken down. Most coal operators do not share this view.

Even before it emerges from the subcommittee it is thought the bill will be greatly revised. The revision is expected to come about as the result of suggestions from operators and the United Mine Workers.

The bill, built largely upon the basis of the report of the National Resources Board, regards the coal industry as a public utility. It proposes establishment in the Department of Interior a National Bituminous Coal Commission of five members to be appointed by the President, three to be disinterested, one a representative of the producers and one a representative of employees.

It proposes an excise tax of 25 per cent on the selling price of all coal at mines, which would amount to about 50c. a ton, with a drawback of 99 per cent to producers who accept and comply with the code. This is plainly meant as a club to compel code appliance. Compliance, bringing with it the drawback, would mean that an operator would have to remit only a ½c. tax. Members complying with the code would not be subject to the anti-trust acts.

There is also a proposed tax of 10c. per ton, of which not to exceed 4c. is to be used for retirement of interest and principal of bonds,

to be issued to the face value of \$300,000,000, and 6c. for rehabilitation of miners thrown out of employment as the result of purchase by the Government of marginal coal lands. The National Coal Producers' Board would allocate district tonnages and district boards would determine the proportion for each mine. Provision is made for licensing of all companies indirectly.

In his testimony before the subcommittee, John L. Lewis called attention to the fact that wage agreements expire April 1, and he expressed doubt that they will be negotiated by that time. He did not say there would be a general strike if the agreements were not negotiated by that time. But the inference was drawn by some that this would be the result. Nevertheless, it is not believed that a strike would be called. Rather, the attitude of Mr. Lewis was held to reflect attempted pressure for passage of the bill and to enforce demands he has made for increased wages and shorter hours. At present the bituminous coal industry, 92 per cent unionized, operates on a 7-hr. day, five-day week. Mr. Lewis wants a 6-hr. day, five-day week with a flat increase of 15c. per ton in cutting and loading; an increase of 50c. a day for all outside and inside day wage men, a 25c. increase in all pick-mining rates and a 20 per cent increase on all yardage and deck work. Lewis claims these increases would amount to only 12c. a ton.

Operators, who have expressed astonishment at the demands, have rejected them, and say that they could not possibly accept them. They have submitted a resolution proposing that the present hours and wage schedule be continued for a year and, among other things, suggested this be done inasmuch as the 30-hr. work-week bill and the Guffey bill are still pending.



# PERSONALS

JOHN M. MULHOLAND, who has been special representative handling railroad sales for the Youngstown Sheet & Tube Co., has been appointed manager of railroad sales for that company. His headquarters will remain in Chicago. Mr. Mulholand was born in Pittston, Pa. He took a marine engineering course at the University of Michigan, class of 1910, and from the latter year until 1917 he was engaged in engineering work, mostly in the mining field. He served in the war, entering the service through the Officers' Training School Tank Corps. After the close of the war until 1932, when he joined the Youngstown company, he was engaged in the railroad equipment field, first as district sales manager of Mudge & Co., and later as vice-president in charge of sales of the O. F. Jordan Co.



J. M. MULHOLAND

WILLIAM J. O'NEIL has been appointed general manager of Dodge Brothers Corp., Detroit, division of Chrysler Corp. Starting as a tool maker, Mr. O'Neil successively became superintendent of the Beaver Mfg. Co., Petrol Motor Car Co. and Michigan Buggy Co., later heading the gas engine department of Fairbanks, Morse. He then was named production manager of Montgomery-Ward and for a time held the same post with A. O. Smith Corp. He became associated with Walter P. Chrysler in 1921 and first was identified with Dodge Brothers in 1928 when, working with K. T. KELLER, president of Dodge Brothers, he accomplished in 106 days the task of putting the Dodge plants on a strictly modern production basis. He will continue to direct production, which has been his special function since joining Dodge Brothers. With the appointment of Mr. O'Neil, Mr. Keller divests himself of the general managership of Dodge Brothers, which he has held since Chrysler Corp. acquired that company. He continues as president of Dodge Brothers and vice-president and general manager of Chrysler Corp.



W. J. O'NEIL

chairman of the Illinois Emergency Relief Commission. This is the second honor of the kind that has been bestowed on this industrial leader. In 1932 he was presented with the Rosenberger Medal for distinguished leadership and unselfish public service in the organization and administration of the agencies engaged in unemployment relief in the State of Illinois. Altogether he had been active in raising and dispensing over \$47,000,000 of relief funds in a period of two years.

HARRY E. FRIEDLEIN has been appointed assistant manager of the Cincinnati branch of the Crucible Steel Co. of America. He has been with the company and its subsidiary, Halcomb Steel Co., for 25 years, except for a time during the war.

WILLIAM H. GRINOLD and GERALD J. GRIFFIN have been made directors of the Wallingford Steel Co.

COL. FREDERICK H. PAYNE, assistant Secretary of War in the Hoover Administration, and formerly chairman of the board of directors of the Greenfield Tap & Die Co., Springfield, Mass., has been elected president succeeding CHARLES N. STODDARD, who is returning to the practice of law. FRANCIS A. SMITH has been made vice-president and secretary, and W. B. DU MONT, heretofore general sales manager, has become vice-president in charge of sales.

H. L. PURDY has been promoted from assistant manager of the St. Louis office of Hyman-Michaels Co. to manager of the San Francisco office. He has been connected with the company for 15 years.

LEE B. LANDON has been appointed manager of the Gary tin mills of the American Sheet & Tin Plate Co. to succeed THOMAS O'BRIEN, formerly head of mills at Elwood, Ind., and Farrell Pa., who will retire on the company pension plan. W. H. HUGUS, who has been an assistant manager at the Gary plant, has been transferred to Pittsburgh in charge of the American Sheet & Tin Plate company's public relations department.

H. H. HOLLOWAY, formerly general superintendent of the Apollo Steel Co., Apollo, Pa., has been made general manager of the Newton Steel Co., subsidiary of Corrigan, McKinney Steel Co. HOWARD L. BODWELL, formerly superintendent of the American Sheet & Tin Plate Co., Vandergrift, Pa., has been made assistant engineer for the Newton Steel Co.

GEORGE HAYNES, formerly assistant to Mr. Holloway, has been appointed general superintendent of the Apollo Steel Co.

G. L. GOODHUE, who has been superintendent of the Farrell-Mercer works, American Sheet & Tin Plate Co., will succeed Mr. Bodwell at Vandergrift, Pa. CHARLES A. FERGUSON, assistant superintendent of the Farrell-Mercer works, American Sheet & Tin Plate Co., has been named superintendent of both plants to succeed Mr. Goodhue.

CHARLES S. BELSTERLING, vice-president, United States Steel Corp., presided at the thirty-fourth annual dinner meeting of the Traffic Club of Pittsburgh at the Hotel William Penn on March 7.



# OBITUARY

FRED CRAWFORD THOMPSON, vice-president and general manager of the Morse Chain Co., Ithaca, N. Y., and Detroit, died at his home in Detroit on March 6. He had been identified with the automotive industry for 32 years and was recognized as one of its pioneers and leaders. Born in Emlenton, Pa., in 1884, he early became a drafts-



F. C. THOMPSON

man with Westinghouse Electric & Mfg. Co., later being associated with the Pope-Toledo Co. as a designing engineer. He also was connected with the Fairbanks, Morse & Co. and the Buda Co., and in the early days of the automobile industry was chief engineer of the Lozier Motor Co. In 1914 he joined the Morse Chain Co. as Detroit manager and during the last five years had been vice-president and general manager. Many of his inventions are being used by the automotive industry today.

JAMES A. MARTIN, president, Marpoe Mfg. & Supply Co., Chicago, dealer in railroad supplies, died recently at his home in Evanston at the age of 53 years.

JOHN W. BOGGS, mechanical engineer, United States Steel Corp., died at his Pittsburgh home on Mar. 4, aged 59 years. He had retired from active service in 1929.

JOHN L. HERWOOD, architectural engineer of Aluminum Co. of Amer-

ica, Pittsburgh, was killed in an automobile accident in Denver on Feb. 25. Mr. Herwood received his formal education at Carnegie Institute of Technology, where he specialized in metal forming and metal work. For 18 years he was affiliated with Rasner & Dinger, Pittsburgh sheet metal firm, and in 1929 he joined the architectural staff of the Aluminum company at Pittsburgh. He was actively associated with an aluminum architectural installation in the research and engineering building of the A. O. Smith Corp., Milwaukee.

GEORGE E. BURROWS, who for many years was engaged in the iron and steel scrap business in the Pittsburgh district, died on Mar. 1 at his home in Fort City, Pa. He was 75 years old.

HARRY DUNN, vice-president in charge of purchases of the Auburn Automobile Co., Auburn, Ind., died of pneumonia on Mar. 1 after a brief illness. He had been director of purchasing for the company since 1923 and previously had been connected with the Willys-Overland Co. at Toledo.

ROBERT GOSS WELLS, vice-president of the Steel Co. of Canada, Ltd., Hamilton, Ont., died on Feb. 22, aged 60 years. He joined the company as works manager in 1913 and was appointed vice-president in 1926.

LOUIS H. BURKHART, for the past 38 years chief engineer of the Struthers-Wells Co., Warren, Pa., died in Pittsburgh, aged 66 years. He was a graduate of the University of Missouri, a member of the American Society of Mechanical Engineers, and a member of the American Welding Society.

MORLEY P. REYNOLDS, formerly vice-president of W. S. Tyler Co., Cleveland, died March 3 after a long illness.

CAPT. WILLIAM E. MACKAY, chairman of the board of the Mystic Iron Works, died at the Hotel Victoria, Boston, on March 2, from a stroke. Captain MacKay was born in Philadelphia in 1865. He was graduated from Annapolis at the age of 20, served in the Navy with distinction, and during the Spanish war was made a captain.

Retiring from the Navy he went to Boston as an engineer for the Boston Gas Light Co. Subsequently he became president of the New England Fuel & Transportation Co. and senior vice-president of the Massachusetts Gas Companies.

WILLIAM C. DEE, Chicago district sales manager for the General Electric X-ray Corp., died Feb. 23 after an illness of about two weeks. He was 45 years old. Mr. Dee had been connected with the company for 25 years.

MORGAN T. JONES, president of the Morgan T. Jones Co., Inc., Chicago, died at the Illinois Central Hospital, on Feb. 25. He was a member of a number of technical societies, including the Western Society of Engineers, American Society for Testing Materials and American Railway Engineering Association. He was born in Wales 74 years ago.

MARTIN L. JOHNSON, for a number of years sales manager of the Reading Steel Casting Co., Reading, Pa., died at his home in Wyomissing, Pa., on Feb. 20. He was at one time identified with the Detroit Steel Casting Co.

ERNEST R. ELDRIDGE, for many years sales manager of the Portland, Ore., office of the United States Steel Corp., died at his home in that city on Feb. 27, aged 67 years. He had been in the steel business all his life, formerly with the American Steel & Wire Co., and had been a resident of Portland for 35 years.

CARLETON S. WHITNEY, president of the Dover Stamping & Mfg. Co., Cambridge, Mass., secretary of the Sheet Metal Association and a director of the NRA hardware code, died of a heart attack at his home in Watertown, Mass., March 5. Mr. Whitney was born in Cambridge, Mass., 38 years ago.

HENRY L. RUSSELL, president of J. Russell & Co., Holyoke, Mass., mill supplies and hardware, died on March 5 at the Holyoke hospital after a long illness. He was born in Chicopee, Mass., April 4, 1861. He was active in trade relations and in organization work of the National Supply and Machinery Distributors Association.

H. C. McELDOWNEY, a director of the Pittsburgh Steel Co., Pittsburgh, died at Atlantic City, N. J., on March 9.



# THIS WEEK IN WASHINGTON

*Long awaited NRA report on basing point system in steel industry proposes group-mill base system and elimination of "expensive cross hauling."*

° ° °

*Federal Trade Commission report on basing points repeats former uncompromising attitude toward industry.*

° ° °

*Guffey coal nationalization bill likely to be killed on floor of Senate.*

° ° °

BY L. W. MOFFETT  
Resident Washington Editor,  
*The Iron Age*

° ° °

*S. Clay Williams' resignation as chairman of NIRB was not unexpected; appointment of successor to be delayed.*

° ° °

*Administration's turning over to congress of NRA revision legislation believed to indicate desire to be rid of troublesome "baby."*

WASHINGTON, March 12.—Conferences, huddles, hearings, studies, reports, investigations, inquisitions, labor agitation, and so on, without end. . . . To the right, to the left, especially the latter, and finally up in the air. . . . Confusion worse confounded. . . . As if what has gone before is not enough, now comes resurrection of hearings on the Wagner labor disputes bill, with President William Green, simply for the purpose of mixing shades, seeing red if the measure is not passed. . . . Labor will walk out or go on strike en masse, one would infer from

Mr. Green's more or less adroit "threats," which couldn't possibly be made as a grandstand play to his union forces. . . . Not at all. . . . Nor to the other 95 per cent of laborers for whom he makes himself self-constituted spokesman.

And unless the automobile makers cast aside the labor board set up by the President, and thereby snub the White House and its authority, there is going to be a strike in the automobile industry. . . . So implies another decidedly minority view supposed to represent that of some 95 per cent of the workers. . . . Either negotiate direct with this small minority and forget the law, which it so loudly champions when the stage setting is right, or the strike is on—again. . . . One would think these gestures toward general strikes would

be the last, if any, trick pulled. . . . None has ever succeeded, except to arouse public resentment. . . . Resulting in failure and a fine form of committing hara kiri. . . . The implied coal strike might have been mentioned but in these days of wholesale laying down tools, in the minds of professional labor leaders, that would be a mere incident. . . .

Now the NRA hearings become warmer, the shunting of the "investigation" by the Administration forces into the so-called friendly hands of the Senate Finance Committee, headed by Senator Pat Harrison, didn't go so well. . . . Or can it be that some of the New Dealers themselves could see NRA pass out without shedding one single salty tear? . . . To say nothing of the general cooling off of enthu-

siasm within the Administration toward this more or less successful Federal conductor of industry. . . . Though headed by Senator Harrison, the subcommittee using the gimlet on NRA has a markedly hostile complexion. . . . Senator King of Utah has been as vigorous as his oratorical colleague, Senator Borah of Idaho, in urging scrapping of NRA from stem to stern, leaving only the wage and hours provisions and restoring the anti-trust laws to full life. . . . And turning the job, or what is left of it, over to the Federal Trade Commission. . . . Other members of the inquiring subcommittee are Senators George, Democrat, Georgia, also in favor of trade commission control; Couzens, Republican, Michigan; LaFollette, Progressive, Wisconsin; Walsh, Democrat, Massachusetts, and Keyes, Republican, New Hampshire. . . . Which makes a rather frigid reception committee for NRA . . . and for "big business." . . .

There is a lot of wailing ahead on behalf of crushed small enterprise and by contrast a lot of political ribbing for big business. . . . Witness the plan for staging what in effect will be a tiresome, boring industry-disturbing debate for the country at large but pap for politicians . . . Clarence Darrow vs. Hugh S. Johnson. . . . Darrow with his good man Friday, Lowell Mason, attorney for the board of inquisitors of unpleasant memory, to lay the trash turned out by the board before the subcommittee. . . . With its muck-raking of the steel and other so-called "big codes," the result of which caused the enraged General to have the board kicked out of existence. . . . Organized labor will tell how the cockpit section . . . 7-a . . . of the recovery act should be strengthened. . . . Francis Biddle, chairman of the National Labor Relations Board, is expected to restate the board's position in favor of the Wagner bill, despite the fact that Mr. Biddle's board was established by the President under a Congressional resolution, designed as a compromise for the Wagner bill. . . . And despite the fact that the White House has never okayed the Wagner bill. . . . But Mr. Biddle has said that unless the Wagner bill, guillotine for company unions, is passed to back up Section 7-a, members of his board "might as well give up and go home." . . . So instead of being clarified in order that the country might get a rest and industry be given a chance to move upward, the air is further putrified with an increasing number of balls by political jugglers. . . . And the country has become a national babble . . . and Babel. . . .

## Williams Resignation Not a Surprise

The resignation of S. Clay Williams as chairman of the National Industrial Recovery Board was not a surprise. Though organized labor long has insisted that he be ousted, the President had entirely ignored the demand, and it is clear that Mr. Williams was not driven from his unenviable job by organized labor or any other element. He accepted the position when NRA was converted from a one-man administration to a board form of government with the understanding that he would not remain because of pressing private duties as counsel for the Reynolds Tobacco Co. The President was so informed by Mr. Williams, as revealed in the correspondence passing between the President and Mr. Williams when the latter announced his resignation last Wednesday.

The President has asked Mr. Williams to remain for at least two weeks longer. Dr. Leon C. Marshall, a member of the board, frequently has presided as chairman at its meeting in the absence of Mr. Williams in the past. For this reason reports have it that he will be made permanent chairman, although the White House has not indicated whom it will name as Mr. Williams' successor; nor has it indicated whether the vacancy on the board will be filled before or after NRA legislation has been enacted.

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## Duquesne Employee Elections Called Off

The National Steel Labor Relations Board has called off its order for an election at the Duquesne, Pa., plant of the Carnegie Steel Co. It did so after it had been petitioned to cancel the order by Charlton Ogburn, representing the Amalgamated Association of Iron, Steel and Tin Workers. Mr. Ogburn's petition was based on the fact that the Fort Dukane Lodge at the Duquesne plant no longer existed. It was recently suspended by the association when some of its members, led by William J. Spang, held a rump convention.

The order for cancellation of the election made upon petition of the association itself reflected a peculiar turn in view of the vigorous efforts for the election made by the association. But it took on an additional interesting twist inasmuch as on March 5 the Circuit Court of Appeals at Philadelphia announced dismissal of the petition to review the order for election. The petition for review by the court was made by the Employee

Representatives, General Body Committee, the steel labor board having been made the respondent. Barring further appeal this court action left the way clear for proceeding with the election, now called off at the request of the Amalgamated association. A similar petition for review is now before the Circuit Court of Appeals with regard to an order of the Steel Board for an election at the McDonald, Ohio, mill of the Carnegie company.

The National Labor Relations Board, however, has ordered an election among employees in the Gary, Ind., plant of the Gary Screw & Bolt Co. The order was granted on petition of Dunes Lodge, No. 50, of the Amalgamated Association of Iron, Steel and Tin Workers. On the merits of the case the board said it found that the necessity for an election in the plant was clearly established. Two rival labor organizations, the Amalgamated union and the employees' representation group, each claimed to represent the workers in the plant.

The board has also ordered an election at the Portsmouth, Ohio, plant of the Wheeling Steel Corp., to name representatives for the purpose of collective bargaining. The order was issued upon petition of a lodge of the Amalgamated, which alleged the company had denied it the right of collective bargaining.

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## ICC Examiner Justifies Proposed Steel Rates

Examiner Frank C. Weems has found justified proposed rates on iron and steel products, in carloads, between southern and official classification territory points. For the most part, they would bring about sharp increases. The new rates are proposed through cancellation of commodity rates and the substitution of eighth-class rates—30 per cent of first-class rates.

In the following table are shown present and proposed rates, in cents per 100 lb., from Birmingham, Ala., as typical origin, to representative destinations in official territory:

From Birmingham to	Rates	
	Present Cents	Proposed 30 Per Cent of First Class Cents
Indianapolis	49	48
Columbus, Ohio	52.5	53
Peoria, Ill.	52	52
Chicago	53	53
Cleveland	57	57
Detroit	58	58
Baltimore	49	60
Harrisburg, Pa.	49	62
Philadelphia	49	62
Rochester, N. Y.	49	66
New York	49	65
Syracuse, N. Y.	49	69
Albany, N. Y.	49	69



# Congress Given Full Responsibility For NRA Revision — Serious Battle Foreseen

WASHINGTON, March 12.—Willingness of the Administration to permit Congress to write virtually its own NRA ticket has given the impression that high officials have perceptibly lost their enthusiasm over that alphabetical agency and prefer to let Congress assume the responsibility for its future. Broad outlines of the Administration program have been laid before the Senate Committee on Finance by Donald Richberg, director, National Emergency Committee, but they leave much room for changes which Congress may see fit to make in extending the act. It is clear that the Administration, in seeking two more years to experiment with the act, is insistent upon maintaining an adequate flexibility in its administration. But it has retreated from its former practice of laying a ready-made program before Congress and pushing it to passage without change.

The Administration has recommended that the act be extended in substantially its present form. In doing so it has not laid itself open to as strong an attack from Congressional critics as it would if it had proposed a detailed schedule of modifications. As it is Congress is becoming increasingly critical of the act, and the so-called Progressive groups, ready to kill it outright, are hopeful, perhaps unreasonably so, that if they cannot end the NRA for good, they can bring about such sweeping changes as to destroy its usefulness. Some Administration officials might not even care if the act were scrapped. It is evident that, having failed even to approach the objective of recovery it was supposed to have achieved, the NRA has generally dwindled in the estimation of even its most ardent erstwhile supporters. Nor are they at all certain as to what lies ahead. For this latter reason it is contended that extension of the act has been laid in the lap of Congress without any specific suggestions from the Administration.

Two years of experimentation plainly have shown that NRA took in more territory than it could possibly govern, despite the enormous bureaucracy set up in Washington. Tacit admission that this is so is seen in the suggestion of Mr. Richberg for elimination from the act of service codes. Attempts to enforce compliance with provisions of these codes have utterly failed. The same is true of some

of the retail codes and to a less degree it is true of many other codes, compliance being dependent more upon the support of the codes given by the affected industries themselves than upon NRA itself.

## Basic Principles Sound

On the other hand, it is widely conceded that the basic principles of the act are sound. These relate to standards of minimum wages and maximum hours and fundamental trade practices. These provisions obviously will be continued no matter what other modifications may be made in the act. The same is true of Section 7-a, which Mr. Richberg has asked to be left in its present form with a request for a legislative statement of general principles to be defined administratively as is suitable to specific cases as they arise. For either industry or labor to think or to affect the belief that it can write its own specification for this highly controversial section is idle. This is said despite organized labor's renewed efforts to compel enactment of the Wagner labor disputes bill on which hearings were begun yesterday, and which is finding support at the hands of one of the Administration's own creations, the National Labor Relations Board. The fact seems to be well established that the Administration is opposed to the Wagner bill, although it has not officially gone on record one way or the other with regard to it.

Contraction of NRA activities by limiting them to interstate commerce, as suggested by Mr. Richberg, long has been seen as inevitable. It is looked upon as a natural outgrowth of experience which showed the futility of trying to enforce codes which generally are conceded to involve intrastate business exclusively, such as service codes. There are those, however, who, by far-fetched legalistic reasoning, contend that even these codes affect interstate commerce. It is an offshot of the century-old argument over interpretation of the commerce clause of the Constitution. It is conceivable also that recent court decisions, particularly those holding that Section 7-a is unconstitutional because it concerns labor and that labor is not interstate commerce, has inspired the recommendation for clipping of the Blue Eagle's wings.

There may be a real contest over this proposal for an element in NRA and labor are strongly insistent that by reason of the large

volume of employment involved in service and other ordinarily rated intrastate trades they should be kept under the jurisdiction of NRA. Mr. Richberg's views, however, are held to be much more logical than those which seek to drag every possible business activity under the classification of "interstate." On the other hand, Mr. Richberg's interpretation of the commerce clause is considerably more liberal than that of more orthodox legal opinion. Repeatedly he has insisted Section 7-a comes within this classification and he maintains that position in the face of court decisions to the contrary. Manifestly, organized labor shares the Richberg view on this point.

Mr. Richberg also has suggested definition of the anti-trust laws for the purpose of legalizing certain code provisions that are recognized as being in restraint of trade. At the same time, this suggestion, designed to prevent unfair trade practices, is coupled with another to prevent so-called monopolistic practices. In this category comes the storm habitually raised in Congress and now again revived about alleged suppression of small business and the granting of monopolistic powers to big business. Codes of the larger industries again are being vigorously attacked by an element in Congress on this score, although actually in some of the industries there exists a greater desire on the part of the smaller than the larger units for continuance of codification. The Administration recommendations apparently were made for the purpose of softening these attacks, led by some who insist NRA ought to be scrapped.

Senator King of Utah was especially active in urging its scrapping both at the hearings before the Finance Committee and on the floor of the Senate. Senator Borah of Idaho and Senator Nye of North Dakota are also prominent leaders in attacks on NRA, and have been joined by the conservative Senator Glass of Virginia, in assailing NRA as promoting monopoly and suppressing small enterprise. They want the anti-trust laws restored to full force. Some of them too would like to see only the basic principles of NRA retained and its operation transferred to the Federal Trade Commission, a proposal strongly opposed by Mr. Richberg who says the FTC does not have the necessary machinery.

NRA itself has made it clear that it proposes to prohibit price fixing and other practices which have been the object of widespread criticism, though exceptions as to price fixing will include natural resource industries.

# Group-Mill Base System is Suggested by NIRB as Means to Eliminate Competitive Cross-Hauling in Steel Industry

BY L. W. MOFFETT

*Resident Washington Editor,  
The Iron Age*

THE National Industrial Recovery Board has submitted a report to the President in which it recommends transformation of the existing multiple basing point system in the iron and steel industry into a group mill base system, as a more practicable means of improving marketing practices of the industry in public interest than by allowing it to revert to the status existing prior to the code.

While suggesting that this change be made by revision of the iron and steel code, the board urges the importance of avoiding violent disruption and proposes application of the principle as is consistent with a due regard for the interests affected.

## President Asked for Report

The report was submitted to the President pursuant to an executive order approving the iron and steel code when it was revised on May 30, 1934. In the order the President directed the Federal Trade Commission and the National Recovery Administration to study further and jointly the operation of the basing point system and its effects, and invited "recommendations for the revision of the code, in accordance with the conclusions reached." More specifically, the order recommended prices quoted on the basis of areas of production and the eventual establishment of basing points coincident with all such areas, as well as the elimination of artificial transportation charges in price quotations. The proposed group mill base system is directly responsive to this statement of the order.

The NRA study was made by

## ISSUE HELD

THIS issue of THE IRON AGE has been held for one day in order to present the first complete story on the important NRA and FTC reports on the basing point system in the steel industry. It being delivered to subscribers on Friday rather than Thursday, the issue conforms with the release date on the reports.

Dr. J. M. Clark of Columbia University, Dr. M. P. Sharp of the University of Chicago, Deputy Administrator R. W. Shannon and Burr Tracy Ansell, of the NRA legal division.

Pointing out that data on the extent to which so-called artificial freight charges increase the price of steel are being assembled by the code authority at the request of NRA, the report recommends limiting the wastes of competitive cross-hauling. To this end, as supplemental to the recommendation of the group mill base system, it is proposed that any revised code carry a provision limiting freight absorptions, the underlying purpose of which would be to limit the wastes of cross-hauling, to reinforce the effect of the group mill base system and to increase price competition. Specifically, it is recommended that this be accomplished by adding a provision to

the code section covering sales on "foreign basing points"—that is, basing points for which a seller does not file prices. This provision would prohibit a manufacturer from absorbing more than \$5 per ton on sales based on a "foreign basing point."

## Might Abandon Price Features Entirely

In the event it is found impossible to secure the acceptance of such a program or to make reasonably rapid progress toward it, the report recommends that consideration be given to the alternative possibility of abandoning the price features of the code entirely. But it is proposed if there appears a reasonable prospect of such acceptance and satisfactory progress toward the goal designated, these features of the code should be retained as affording a better means of transforming the basing point into a sound and satisfactory one than by allowing this system to revert to the status existing prior to the adoption of the code.

At the same time, the board informed the President, efforts will be continued to deal with specific complaints and abuses and to gather additional data on the operation on the present basing point system, especially on the wastes of competitive cross-hauling.

The report treats the organization of the iron and steel industry from its incipency to its present vast proportions, and the technological and geographical developments leading up to the present basing point system, which is described in detail. It discusses several alternatives to the existing



system, conceding that the present system is "far from perfect" and reaches the conclusion that the group mill base system is the most satisfactory practical substitute.

#### New System Defined

The report defines the group mill base system which it proposes for the sale of all products except pig iron, wrought iron and rails, the latter being treated somewhat differently:

"Group mill bases shall be established as follows (a) within 50 miles of each town at any time containing a total capacity for producing 20,000 tons per year or more of iron and steel ingots and also containing facilities for rolling or otherwise shaping such ingots into blooms, billets, slabs, sheet bars or other primary or semi-finished forms. It would be required that there be a group mill base for which base prices shall be filed for each product produced at any plant located nearer thereto in terms of all-freight than to any other group mill base; (b) all existing basing points other than those which may be designated as group-mill bases in above shall become group mill

bases for which base prices shall be filed for any product now based at such points which is produced at any plant located nearer thereto in terms of all-freight than to any other group-mill base."

The report said that the plan would necessitate the establishment of 19 entirely new group mill bases and the expansion to include additional products of 10 existing basing points for such products. This method, the report pointed out, would leave only approximately 1% per cent of rolling mill capacity more than 50 miles from a group mill base. The freight charges would be approximately actual freight rather than arbitrary freight from distant competing points.

#### Advantages of Plan

The features of the group-base plan, the report said, would include:

A. An approximation to a mill base system while avoiding the impracticabilities of the latter. Freight charged to customers would be approximately actual freight rather than arbitrary freight from distant competing points.

B. Compact group mill base districts, coinciding with all districts

producing even relatively small amounts of primary iron or steel.

C. All pig iron capacity would be within 50 miles of a group mill base.

D. Only 1% per cent of rolling capacity would be more than 50 miles from a group mill base.

E. The rolling mill capacity referred to in D, above would, in general, consist of isolated, small rolling mills without steel-making capacity, whose costs would naturally reflect the cost of transporting the steel to their works and consequently would, in general, be based upon the steel-making group mill bases from which they purchased semi-finished steel.

F. Plants making steel for castings or products not covered by the steel code, but able to make ingots incidentally, are properly disregarded by the requirement in the group mill base definition for rolling or other facilities for producing semi-finished products.

G. Plants representing over 98 per cent of the capacity of the industry as covered by the code would file base prices at a group mill base in their immediate vicinities, and thus be able to take any advantage of their economic situation, as they might choose, and would not have to maintain a price on a distant group mill base.

H. As "plant-towns" containing roll-

### Highlights of NRA Report Which Indicate Its Grasp of Industry's Problems

(1) We have seen that not all the criticisms of the basing point system are justified in the terms in which they are made. But we have seen that it does not tend to be as serviceable a form of competition as a system in which there is more incentive for a producer to lower his base price as a means of extending his sales area, rather than doing this by merely absorbing freights and discriminating. We have seen that there are wastes of competitive cross-hauling, which must ultimately be charged to the consumers, and that certain purchasers are burdened with artificial freights. Piece-meal change will not avoid the existing hostility which, whether fully justified or not, is attached to the principle of artificial freights which characterizes the basing point system. This hos-

tility may be avoided if such changes as are made as parts of a comprehensive program having as its goal the establishment of a system based upon a different principle.

(2) We have seen that a change to f.o.b. mill selling would be too uncertain and disturbing in its effects to be seriously considered at this time, or at any time without exhaustive preliminary inquiries. We have seen that a mill-base system will not remedy the principal objections mentioned above unless it is combined with the abolition of freight absorptions (which is inadvisable) or their limitation. And we have seen that neither of these things can, in all probability, be accomplished by Federal compulsion, but only by such cooperative effect as can go on under the code form of organization. We have also

seen that a mill base for every single mill would add unnecessary complications and yield no substantial advantage as compared to a group mill-base system. We have seen that the principle of actual rather than artificial freight is sound and desirable, but not necessarily to the extent of requiring the removal of the minutest discrepancies between them, but only discrepancies which are sufficiently substantial to be an important and characteristic feature of the system. It is sufficient if the characteristic feature of the system is the basing of prices on approximate freights, disregarding minor differences. A system of this character is better described as a group-mill-base system than as a modified basing point system.



ing facilities increase their steel-making capacities from negligible amounts to amounts greater than 20,000 tons annually, it would automatically be required that a group mill base within 50 miles be established, if none already existed. Conversely the group-mill bases would automatically be abandoned in cases where sufficient decrease in capacities took place. This would provide a flexibility for the designation of group-mill bases, insuring sufficiency of these without the necessity for any amendments to the language of the code.

I. Elimination of basing points at non-producing points, such as certain Gulf and Pacific ports, which are open to abuse and inequality. The last feature is open to adjustment, including possible exceptions to the provision for limiting freight absorption which it is here proposed to combine with the group-mill base system. Such exceptions, possibly temporary in character, might be required to avoid undue disturbance to the marketing areas now reached by existing producing centers which ship via these ports to distant markets.

#### Present System Unduly Criticized

The report asserts that not all of the criticisms of the basing point system are justified in the terms in which they are made. At the same time that system, it states, does not tend to as serviceable a form of competition as a system in which there is more incentive for a producer to directly lower his base prices as a means of extending his sales area, rather than doing this indirectly by merely absorbing freight.

"We have seen," the report added, "that there are wastes of competitive cross-hauling, which must ultimately be charged to the

consumers, and that certain purchasers are burdened with artificial freights. Piece-meal change will not avoid the existing hostility which, whether fully justified or not, is attached to the principle of artificial freights which characterizes the basing point system. This hostility may be avoided if such changes as are made are parts of a comprehensive program having as its goal the establishment of a system based upon a different principle."

The report brought out, however, that the number of basing points has expanded under codification. The tendency under the basing point system has been to increase the number of basing points gradually as new points of production gained in importance. "And there can be little doubt or no doubt that, if the system is to continue, this process should go on as rapidly as may be without doing undue harm to producers whose interests are bound up with the existing price structure," the report said.

The multiple basing point system in use today is explained as a "system whereby prices are named for products at specific points, not necessarily mills, and billed to include freight from those points to points where the products are taken and used by purchasers."

#### "Adequacy" of Present Basing Points

The report includes comprehensive data on the distribution of production of different classes of products relative to existing basing points, which shows what percentage of productive capacity is

now located (a) at basing points; (b) not at, but within 50 miles; and (c) at greater distances. It further shows that different classes of products vary considerably in the sufficiency of basing points located near to existing productive capacity. The most sufficient situation in this respect is found in the case of structural shapes, 92 per cent of productive capacity being within 50 miles of existing basing points. Perhaps the greatest inadequacy is found in the case of sheets where only 6 per cent is at basing points, 44 per cent at or within 50 miles, and approximately 50 per cent more than 50 miles.

The substantial objections to a basing point system commonly urged, the report declared, involve the distance of producing plants from basing points. A detailed study of the relationship of producing capacity to basing points for principal products has been in preparation through the life of the code, the report stated.

The report added that it is conceivable that the emergency justified giving industry temporarily greater power to protect itself against the excesses of competition than would be justified in the long run and under conditions in which demand bears a more normal relation to productive capacity.

#### Competitive Anomalies

"The basing point system involves discrimination in the sense of accepting different net yields at the mills on sales to different localities" the report declared. "Where such discrimination is found, it is often argued that one or the other

DISTRIBUTION OF CAPACITY WITH RESPECT TO BASING POINTS  
(From NRA Basing Point Report)

Products	At Basing Point		Not at But Within 50 Miles of Basing Point		Not Within 50 Miles of Basing Point		Total Tons
	Tons	Per Cent	Tons	Per Cent	Tons	Per Cent	
Pig iron.....	12,834,700	40.85	14,949,255	47.58	3,637,600	11.57	31,421,555
Blooms, billets and slabs...	12,080,200	25.2	22,964,020	47.9	12,874,300	26.9	47,918,520
Merchant and concrete bars...	4,092,200	29.1	5,776,400	41.0	4,209,325	29.9	14,077,925
Sheet and tin plate bars....	3,119,600	33.5	5,113,300	55.0	1,067,020	11.5	9,299,920
Structural shapes.....	1,407,500	26.1	3,534,800	65.6	453,000	8.5	5,395,300
Plates.....	1,521,350	24.7	3,080,300	49.9	1,566,200	25.4	6,167,850
Sheets.....	512,100	6.3	3,075,200	37.6	4,581,500	56.1	8,168,800
Hot-rolled strip.....	586,000	11.8	1,707,500	34.3	2,688,000	53.9	4,981,500
Cold-rolled strip.....	225,900	21.8	382,500	36.9	427,200	41.3	1,035,600
Tin mill black.....	276,500	10.3	1,565,400	58.1	849,900	31.6	2,691,800
Tin plate (I).....	306,380	10.6	1,797,550	61.9	799,450	27.5	2,903,380
Skelp.....	1,133,000	27.1	2,444,200	58.7	594,000	14.2	4,171,200
Pipe, etc.....	1,327,600	15.5	3,742,600	43.7	3,488,200	40.8	8,558,400
Wire rods.....	780,000	18.1	2,255,000	52.4	1,269,000	29.5	4,304,000
Wire nails and staples, barbed wire and fencing..	306,650	9.5	1,817,700	56.6	1,087,850	53.9	3,212,200
Wire, drawn.....	762,500	19.1	1,606,400	40.2	1,631,900	40.7	4,000,000
Totals.....	41,272,180	26.1	75,812,125	47.9	41,224,445	26.1	158,308,750

(I) Includes small quantity of terne plate.

price must depart from a competitive standard. This assumes that there is one level and only one, relative to cost of production, to which competition tends to bring prices. The fact is that there is no such level representing the natural results of any and all kinds of competition. Competition under certain conditions can drive prices to a level which would fail to cover all the operating expenses of an efficient concern; under other conditions genuinely independent rivals selling without collusion may tend to bring about a price hardly distinguishable from that of a monopoly, or both types of rivalry may be practised by the same concern at the same time in different parts of its market area."

The report points out as interesting the fact that the larger steel producers in general, and the United States Steel Corp., in particular, have over a long term of years shown a declining percentage of the total steel business of the country.

"This may be taken as evidence pointing toward the conclusion that they have adhered more closely to published prices than their competitors have done; or it may be due to other causes" the report said. "In the former case, it still does not prove that prices have been fixed at levels above that supposed to result from competition, even if it were admitted that the methods of arriving at these prices had departed from those supposed to be employed in the (non-existent) 'perfectly competitive' market."

#### Present System May Make Agreements More Effective

The board explained in the report that there is no intention to assert that agreements have no power to fix prices higher than they would be in the absence of agreement, or that agreements are desirable.

"The point is merely that there is not one level to which rivalry without collusion always tends to bring prices, and another and higher level to which non-competitive agreements tend to bring them. Rivalry without collusion is not always accompanied by the competitive price of pure theory, nor collusion or agreement by the theoretical monopoly price." For the purpose in hand, the basing point system is to be regarded as a system fixing the character of the geographical price structure (relation of prices to each other in different localities) which does not directly control the levels of prices but may indirectly result in modifying them through modifying the character of competition carried on under it, or modi-

### How the Change Suggested by NRA Board Would Affect Section 3 of Schedule E of the Steel Code

(Italics Indicate Proposed Addition)

Section 3.—Except as hereinafter otherwise provided in respect of standard Tee rails of more than 60 lb. per yd. and angle bars and rail joints therefor, the base price for any product shown in any list of base prices filed by a member of the code in accordance with the provisions of the foregoing section 2 shall be as follows: (a) If such member shall operate a plant for the production of such product which is located at a basing point for such product, f.o.b. such basing point, or (b) if such member shall operate a plant for the pro-

duction of such product which is not located at a basing point for such product, f.o.b. the basing point for such product nearest in terms of all-rail freight rates to such plant, *provided the delivered price to the destination in question, based on such other basing point, is not less than the delivered price at which such member could sell to such destination from the base for which such member files and based on the price which he has there filed, by more than 25c. per 100 lb., or \$5 per ton, etc.*

fying the results of attempts at non-competitive price-fixing by understanding or otherwise. Or by modifying the effects of competition it may modify the likelihood of agreements being resorted to as, for instance, if it minimizes the danger of extreme cut-throat competition, it may make it possible for an industry to get on without resorting to outright agreements, to which it would otherwise be forced. Or, on the other hand, the system may tend to make agreements or arrangements of similar effect more easily workable and enforceable, as is frequently charged."

#### In Line With President's Suggestion

The various criticisms directed at the basing point system and the numerous alternatives suggested are discussed fully in the report. But in arriving at the proposed group-mill basing point it says the formula suggested deserves to be classed as a group-mill base rather than a basing point system, in that the element of arbitrary freight would no longer be dominant, although not entirely eliminated.

The report found that, if a change caused relaxation or abandonment of the formal recognition of the basing point system the industry would unquestionably continue to use the basing point system, even though the present absolute conformance therewith might be somewhat weakened on that account. If conformance were weakened, the report pointed out, this would presumably weaken also the effectiveness of the open price sys-

tem, since it is upon faithful compliance with the terms of the basing point system that producers rely for knowledge of the prices that their competitors are actually charging at the various points of consumption.

"If producers want to reach understandings as to price, they will not be prevented from doing so by abolishing the price system which they now find convenient for their purpose. They would learn to bring about the same result with any other system, so long as it is an open and orderly one, and any other kind would be hard to defend. The abolishing of the basing point system would temporarily make such understandings more difficult to reach and make effective, but by itself would in all probability have no lasting effect in preventing them."

#### Rejects F.o.b. Mill Plan

The report explains that the comparison between the basing point system and the various other possible systems is a somewhat difficult one, with advantages and disadvantages on each side.

It rejects the proposal for an f.o.b. mill base system, whose disturbing features are listed. Likewise it expresses the view that compulsory adoption of such a system, which would call for positive legislation, would be of extremely questionable constitutionality.

#### Competition Would Assert Itself

The report demonstrated that with freight absorptions abolished, competition under either a basing



point system or a mill base system would almost certainly act with more force to lower prices to consumers. With unlimited freight absorption, the mill base system would probably be less effective than the basing point system from this point of view, and might not be much less objectionable from the standpoint of the high prices charged to customers near the present non-basing-point mills, since there is no guarantee that these high prices would be materially lowered and the discrimination they represent materially reduced.

"The individual mill base system," the report added, "with abolition or serious limitation of freight absorption, is too disturbing a change to undertake at this time, if ever. With full liberty of freight absorption, the individual mill base system might bring about substantial changes, or it might produce no more than a nominal effect on prices and leave things much as they are now, except for the potentiality of change whenever a single producer sees fit to initiate it.

"The basing point system puts a maximum of producers in competition with each other over any given area, but only those quoting prices on the home basing point are

competing in a way tending very directly to reduce the price.

"The individual mill base system in its literal form would wipe out the competition of a number of producers scattered over a moderate area, meeting each other on equal terms over the whole of the area and all equally free to initiate cuts in prices. What it would substitute would depend on what was done by way of limiting freight absorption.

"The group mill base system with limited freight absorption would combine the equal competition of a group of mills over their natural common market area (though in smaller groups and areas than at present) with the competition of producers outside the group, seeking to expand their sales into this market area, but with their power to expand in this way dependent on their own base prices, so that to expand their marketing area beyond its existing limits, they must reduce their base prices.

"This seems to be the most promising combination of elements, from the standpoint of giving competition reasonable scope and effectiveness in protecting the consumer, without radically disrupting existing interests or methods and channels of trade."

## Study of Freight Paid and Freight Added to Prices

Additional material, which has been in the course of preparation since September, 1934, was submitted by the American Iron and Steel Institute on March 2, 1935. The material was assembled at the request of the National Recovery Administration as the first of a series of surveys to collect accurate data relating to this problem. The division of research and planning has not yet had time to analyze the material submitted nor to determine its significance.

The survey covered a total distribution of 1,534,000 net tons of steel code products, or approximately 20 per cent of the national total for steel code products for the three months' period. The mills from which the data were secured represent 85 per cent of the capacity for finishing rolled steel products within a 50-mile radius of Pittsburgh.

For a total invoiced delivered value of \$92,072,000 the actual freight paid from the producing mill to the point of consumption was \$8,312,000. This actual freight paid exceeded the freight charges added to basing point prices by \$1,639,000.

## Would Compel F.o.b. Quotations by Law

**T**IMED with the NRA-Federal Trade Commission reports on the basing point system in the iron and steel industry, Senator Bankhead and Representative Huddleston of Alabama introduced identical bills in the Senate and House of Representatives to compel quotation of prices at production points. This means in the steel industry an f. o. b. mill base, on which the commission has repeatedly insisted in its report.

Neither Senator Bankhead nor Representative Huddleston in brief comments on the measure detailed the exact purpose of the measure but it was made clear that it is meant to compel an f. o. b. mill pricing system in the iron and steel industry as well as to strike at chain stores. Not only would the measure impose that system, but it would also eliminate quantity discounts, also said to be designed to eliminate price differentials between large and small buyers of steel and other products. It was a reflection of attacks on NRA as encouraging so-called monopolies and suppressing small enterprise. It was stated the bill would find considerable support in both houses of Congress.

Representative Huddleston is the

ranking Democratic member of the House Committee on Interstate and Foreign Commerce, to which the measure was referred. The Senate referred the Bankhead bill to the Committee on Interstate Commerce. Intended to come within the commerce clause of the constitution, the measure would affect producers engaged in interstate commerce.

Opponents declare the bill is unconstitutional, but it is expected that it will be brought up for action at an early date and may be tied in with the pending legislation to extend NRA.

Known as the Equal Rights Trading Act, the third and fourth and vital sections of the act read as follows:

Sec. 3. It shall be unlawful for any person, engaged in commerce, to fix or quote a price for any goods, wares or merchandise, other than the price at the place where such goods, wares or merchandise are manufactured or from which they are shipped by such person, or to sell such goods, wares or merchandise for a price fixed on any other basis unless the purchaser of such goods, wares or merchandise affirmatively requests that the price be fixed on the basis of delivery at a particular destination.

Sec. 4. It shall be unlawful for any person engaged in commerce, in the course of such commerce, to add to the shipping point price of any goods, wares or merchandise a charge for delivery to a destination which is other than the actual cost of such delivery through such agency as the buyer shall specify.

The bill carries a penalty clause for violation of not more than \$5000 or imprisonment of not more than one year or both. It also carries an anti-trust provision by which any person injured by the measure if declared illegal can sue in the District Federal Courts and recover three-fold damages.

Representative Huddleston, in speaking of the bill, mentioned the consent decree in the Pittsburgh-plus case out of which grew the Federal Trade Commission order to cease and desist that method of quotation. He stated what he said was the subsequent policy of the steel industry in quoting prices and said that it was "time something be done about the Pittsburgh-plus system of quoting prices." Actually, of course, steel prices now are quoted on some 66 basing points.

Senator Borah of Idaho has approved of the measure, as have other members of Congress who are attacking NRA.



# FTC Calls Basing Point System "Price Fixing" Device

VIGOROUSLY attacking the multiple basing point system in the iron and steel industry as a price fixing device, the Federal Trade Commission in its report to the President, on the system, makes the outright recommendation that what it calls code provisions giving executive sanction to the multiple basing point system be eliminated. It thereby proposes that the system be made open to legal attack on the ground that it violates the anti-trust laws. It points out that if the system be eliminated from the code, it would, of course, be excluded from protection under the National Industrial Recovery Act provision exempting those complying with the code from anti-trust action.

"If the suggested action were taken," says the report, "it would be again open to the Department of Justice or this commission, if the facts warranted, to go forward in formal proceedings to test the basing point system under the Sherman act or the Federal Trade Commission act, whereupon the ultimate decision would rest upon judicial determination."

The proposal clearly would point to the scrapping of the code. Likewise, it would mean that jurisdiction over the price policy of the industry would be taken over either by the Department of Justice or the commission. The recommendation is not new. It was made by the commission in its report to the Senate in March, 1934.

## Would Take Out Other Code Provisions

Other recommendations made by the commission call for elimination of provisions in the Steel Code which are declared to aid in price fixing and those relating to regulation of production and capacity. The latter refers to the code provision barring erection of new blast furnace or open-hearth capacity without sanction of the Code Authority. These two recommendations also have previously been made by the commission. Its entire broadside against the code and the basing point system is largely a reiteration of prior attacks. The present report, however, is possibly even more scorching than its predecessors.

The really new angle in the report is that the commission has

dropped its former recommendation that iron and steel prices be quoted on an f.o.b., mill base. It still insists that the principle is correct, but it sees legal difficulties, as well as the fear that the industry would not adopt the plan.

"We would recommend such a course," says the commission in commenting on the f.o.b., mill system, "if we had assurance of adherence thereto by the industry. We are of the opinion, however, that the industry would decline to submit to such modification and that it would become necessary to either cancel the code or to attempt to impose a code so amended upon the industry. It is quite possible that the industry's leaders, in common with interested parties in general when litigation arises, would insist that what they have done is lawful. They are entitled to be heard judicially on the merits of their case, if they so desire. Moreover, to attempt the reform over the industry's resistance would not save time, for the matter would doubtless be litigated. The commission and the courts have been constituted for the purpose of hearing and determining such controversies."

The commission reaches its recommendations, as does the NRA, after discussing a number of alternatives. The NRA, however, differing widely with the commission, turned to a compromise plan. The commission, in considering the effect of a change in the basing point system, gives more than the usual consideration to the effect it would have in other industries which have some system of basing prices.

## Criticism Covers Wide Field

Criticisms of the Commission run a wide gamut. It attacks the basing point system in the industry as a price fixing device, and denies that the amended code, by increasing the number of basing points, has relieved the situation. On the contrary, it says some of the amendments to the code have tended to make price fixing even more effective "and others heralded as restraints upon price fixing have no real value as such."

It charges the American Iron and Steel Institute with refusal to submit detailed records to the Commission, and mentions the Insti-

tute's so-called policy of assessing fines upon producers and jobbers who do not charge prices fixed under the basing point system. During August and September, 1934, the report says, 30 fines were assessed at the code rate of \$10 a ton. Detailed records of the fines, it is declared, were denied the Commission. "Yet these fines," it adds, "were imposed because of sales made to the Federal Government at less than the fixed delivered price."

It alleges that base prices of steel are highly artificial and says this is evidenced by the fact that while the base price of rolled steel at one basing point may be continuously higher than at another, costs of production are lower. "Yet extensive shipments by the high-cost mill," says the report, "may be made into the territory of the low-cost mill." While recent costs were not available to the Commission, Pittsburgh is cited as an instance where the cost of production in 1920 was higher than at Birmingham and Chicago, but its base prices were then and have continued to be lower.

## Price Fixing Charged

In contending that the basing point system not only permits and encourages price fixing, but that it is price fixing, the Commission refers, not only to its report of last March, but to what it declares is evidence of conditions existing since the code was amended May 13, 1934.

"Evidence in the form of bids by various steel producers and jobbers on Government business," says the Commission, "particularly bids to the Navy Department, is to the effect that bids on large quantities, containing numerous items, are identical in gross amounts and in unit prices to the fourth decimal point. The identity of bids has been so consistent that Government purchasing officials are reduced to the impotence of making awards by lots. Private buyers are in no better position than the Federal Government."

The report declares that so-called collusive activities among steel producers calculated to bring about the adoption of identical base prices, disclosed in the report to the Senate, have continued since the amendment of the code as indicated by documentary evidence obtained by the Commission. It is declared that a full investigation of this phase of the "industry's price fixing activities under the amended code could not be made, because the American Iron and Steel Institute, directors of which

are the Code Authority, and the heads of certain organized groups affiliated therewith refused to supply certain documentary data in their possession called for by this Commission."

#### Extras Attacked

In attacking the system of standard extras, the Commission said that "by manipulation of the amount of these 'extras' steel producers have been enabled to obtain the benefit of price increases without changing the base price." Again it is charged that the Institute declined to furnish certain data relating to extras. Reference is made to alleged increases through the system of extras of from \$10 to \$52 a ton on sales to the Navy. "With the percentage of increase ranging from 100 to 500 per cent," it is contended that large extras were established on some items where there had been none before. It states that widespread objections to extras have come from jobbers and small enterprises.

#### Jobber Prices Criticized

Attack also is made upon what are called resale prices to jobbers, fixed under the amended code. The so-called imposition of fines for producers and jobbers who do not charge the delivered price is declared to be in marked contrast to the statute requiring competitive bidding on Government purchases and decisions of the Comptroller General. Under his decisions, it states, Government purchases were exempt from what are called price fixing provisions of the code.

"Nevertheless," it is declared, "the American Iron and Steel Institute undertook to prevent these decisions from becoming effective by a program of orally advising members of the industry to ignore such decisions. The Commission says it sees no difference in principle between a single and multiple-basing point system, and, "so long as the power exists to control relative prices at the different basing points, any benefit from additions to the number of such points may become wholly illusory. Moreover, when the so-called multiple basing point system is analyzed, it is found to consist of an aggregation of single-point systems, each controlling the delivered price in its territory. On certain important steel products several single-point systems each dominate the delivered price within separate sections which are each so large as to be composed of numerous States."

#### Only a Few Basing Points Added

It is declared that few increases in the number of basing points were provided for in the amended code on

the items comprising an overwhelming percentage of the total production, "only three being added to the aggregate of 60 basing points established under the original code."

Speaking of other amendments to the code which affect prices, the commission says it is still required that 10 days elapse before base prices filed can become effective, but, under an amendment, if the prices filed at any basing point should happen to be different, the lowest price may be met immediately without action being hampered by the 10-day requirement. On this basis it is contended that it is thus apparent that it is more difficult to make price reductions than it was before the amendment.

Attack is also made on an amendment providing for power of suspension and review by the administrator. It is stated that the administrator has no power of suspension and review under the amendment unless the directors' action constitutes modification of or exemption from the code.

The amendment that delivery charges may be reduced at rates approved by the code authority as "equitable and necessary in order that competitive opportunity to producers and consumers shall be maintained," is placed under fire. The commission says that since the industry subsequently decided that abandonment of the all-rail requirement would destroy equitable opportunity among producers to compete "it is obvious that the amendment can give no relief to consumers when determination of what is equitable and necessary is under the producers' control."

It is also declared that, as amended, the code removes doubt that formerly existed as to whether the directors had power to substitute arbitrary freight and switching charges from basing points for the actual charges therefrom as part of the formula for calculation of delivered prices.

#### Water Transportation Advantages Denied

It is also charged that producers and buyers favorably located as to water transportation are denied the natural advantages of their location, and that "for the sole purpose of preventing price competition, the use of water transportation is discouraged. The economy therefrom is diminished, and to the extent that the steel goes by water, the saving is appropriated by the steel producer."

Another so-called artificial element in the price structure is declared to be the 65 per cent freight allowance from the delivered price when the shipment is made by

truck. A double artificiality in the delivered price is said to occur when steel is sold for fabrication-in-transit. It is stated that the delivered price of such steel is calculated by adding the all-rail freight from the ruling basing point to the point where the fabricator may erect an identified structure, although the steel is actually shipped to the shop of the fabricator. "Thus," it is stated, "artificial freight may be added not only from a place where the steel is not shipped but to a place where the delivery is not made."

In summarizing, the Commission declares that there is no substitute for price competition as a regulator of prices, and says that inefficiency is fostered by price fixing, particularly so in a huge amalgamation. It is also declared that numerous economic studies show that the moderate-sized plant has a low, and often lower, unit costs than the predominate interest in a given industry, and yet is protected against "the unfair employment of the great resources of huge competitors."

## Will Modernize Old Falcon Sheet Mills

HENRY A. ROEMER, president, Sharon Steel Hoop Co., Sharon, Pa., and associates have acquired the Falcon plant of the Empire Steel Corp. at Niles, Ohio. The new corporation will be known as the Niles Rolling Mill Co., with authorized capital of \$1,000,000 in 6 per cent non-cumulative preferred stock and 10,000 shares of no par common stock. The new company intends to make a full line of sheet steel products, including black, blue annealed and cold-rolled sheets, annealing stock, galvanized finishers and long ternes, and also is considering the production of tin plate later on.

Officers of the new company are: Henry A. Roemer, president; Donald W. Frease, vice-president and general manager; Myron C. Summers, vice-president in charge of sales; James A. Roemer, secretary-treasurer; Donald J. Neuman, sales manager; Edwin G. Fenton, works manager, and David S. Smith, superintendent.

Work will be started promptly on the installation of modern sheet mill equipment for the production of 60,000 to 70,000 tons of sheet steel annually. When the plant is ready for operation, employment will be furnished for approximately 300 workers.



# Institute Defends Basing Point System

IN explaining the basing point system and why it fosters competition among producers of steel, and broadens purchasers' sources of supply, and what the results of discontinuing the basing point method would be, the American Iron and Steel Institute states that the following results would ensue from adoption of f.o.b. mill prices:

1. If the basing point method were abolished in favor of prices quoted f.o.b. mills, virtual monopolies would be created in favor of those mills which are located near advantageous markets;
2. Production would be seriously decreased in some of the largest producing centers, such as Pittsburgh and Youngstown, if the basing point method were disturbed;
3. Under the basing point method, the purchaser of steel products has the advantage of several sources of supply at competitive prices; under a method of f.o.b. mill prices he would be virtually at the mercy of the nearest mill.

The institute statement goes on to say:

Any producer of articles for sale must adopt some method of quoting prices for his products. The most common methods include the following:

1. Quoting a so-called zone price or a uniform price at any place of delivery within a specified section of the country.
2. Quoting a price f.o.b. mill or plant where produced.
3. Quoting a price f.o.b. a named place or basing point which may or may not be a place of production.

One or another of those methods of quoting prices generally is adopted by a producer of manufactured articles who wishes to publish prices for such articles in order that prospective purchasers may be able to determine what they must pay for such articles. The practice of quoting a price f.o.b. a named place, called a basing point, happens to be the one which was long ago adopted in the steel industry.

One of the principal reasons, if not the chief reason, why the basing point method of quoting prices is so deeply rooted in the steel industry, is found in the effects of transportation charges on the cost of steel products to users. Most of the common classes of steel products are of comparatively low value in proportion to weight, and freight charges for shipments over any considerable distances, therefore, may be equal to a substantial frac-

tion of the total value of the product shipped.

As a result, the comparative costs of delivery from different sources of supply to any purchaser of steel products would largely determine the limits of competition, if there were not provided some way of equalizing such transportation costs, as among various producers who may wish to compete for the business of any given user of steel.

For various reasons, many producers of steel products have plants that are located in places which are not close to the chief markets for their products. This condition is especially true of many, if not most, of the smaller producers in the industry. Conversely, many users of steel have plants located in places which are remote from their best or preferred sources of steel products. Changing industrial conditions may have brought about these dislocations. Unless such producers and users of steel are to be at serious competitive disadvantages in their respective industries, some way of equalizing freight costs on shipments of steel products must be available.

Among the common methods of quoting prices as noted above, the basing point method is the only one providing a convenient and flexible means of equalizing costs of delivery which have to be borne by the purchaser of steel. By the adoption and use of that method the steel industry has increased the freedom of competition among all producers of any class of product at any given place of consumption. At the same time it has widened the range of available sources of supply from which any user of steel may satisfy his needs, without penalty of price. In effect, therefore, the tendency of the basing point method of quoting prices is to make actual costs of steel lower to the average user than otherwise would be the case.

For many years Pittsburgh was the only or the principal place for which f.o.b. prices for steel products were commonly quoted or published because at one time practically all of the steel of the country was made in or near Pittsburgh. Producers of steel products quoted their prices based on Pittsburgh irrespective of where the places of production might be, and purchasers of steel products figured the cost of such products as if they were delivered from Pittsburgh irrespective of where the actual source of supply might be located. That practice of quoting prices by producers and figuring costs of products to purchasers provided a simple and convenient method of comparing prices; it had the effect of making all sources of supply equally available to any purchaser without penalty of price; and it made all sources of demand equally

open to the competition of any producer which desired to participate therein.

In later years, especially since the action by the Federal Trade Commission in the so-called "Pittsburgh Plus" case in 1924, many places other than Pittsburgh have come to be recognized as places for quoting prices, that is, as basing points, for one or more classes of steel products. With few exceptions all those newer basing points are places at which production of steel products is greater than the consuming demand of the district. The exceptions are mainly places that are ports on the Gulf and Pacific Coasts, at which it has been customary to quote prices for steel products largely to provide a price basis for meeting the conditions created by importation of foreign steel.

Because the basing point method of quoting prices has continued almost from the beginning of the steel business in this country and because of its convenience to all concerned, provision was made in the Code of Fair Competition of the Iron and Steel Industry for publishing prices f.o.b. named basing points, as a practice fitting present conditions in the industry. Under the steel code there are more than 80 places which serve as basing points for one or more classes of products, but none of those places is a basing point for all the products listed in the steel code.

The present basing point method of quoting prices is in principle the same method under which the modern steel industry has operated for more than 40 years. Prior to 1899, however, the steel industry had never produced in any one year as much as 10,000,000 tons of steel ingots. Its present capacity is approximately 70,000,000 tons of steel ingots per year.

The industry, as now organized, has developed to this size under conditions which included the practice of quoting prices on the basing point method. Many steel plants have been located in places which have advantages as producing points under such a method of quoting prices, but which would not be desirable places from which to distribute steel products if the basing point method of quoting prices were not continued. At the same time, many, if not most, of the purchasers of steel products have established their businesses under conditions which included the use of the basing point method of quoting prices for steel products and many of the places where such businesses were established would prove to be less attractive locations if the basing point method of quoting prices were not to be continued.

If the basing point method of quoting prices for steel products were not to be continued, some other method of quoting prices would have to be substituted. What other method might be adopted may be open to question, although it may be assumed from statements made by critics of the basing point method that to those critics, at least, a method of quoting prices f.o.b. producer's mill would appear to be more in keeping both with the interest of purchasers of steel products and



with the public interest. But irrespective of what method of quoting prices might be adopted by or required of the steel industry, if the basing point method were not to be continued, the effects of such a change would be very serious dislocation of producing activities among members of the industry and very serious disruption of long-established commercial relationships between producers and consumers of steel products.

It is not easy to predict all the effects which would follow from discontinuing the basing point method of quoting prices for steel products, but among the effects there would be in some places restriction of markets, lessened production and sharp decreases in the demand for labor, possibly to the ultimate elimination of some activities on which many workers depend. In other places there would be monopoly of important markets, stimulated production, and accompanying sharp increases in the demand for labor.

These aspects of the question were discussed by representatives of the industry who helped in drafting the steel code and it was then recognized that while it might be greatly to the selfish advantage of some members of the industry to favor some method other than the basing point method of quoting prices, such as f.o.b. mill, it was generally agreed that there should not be any effort to change the existing conditions under which the industry had been developed and which were then satisfactory. The reason for that conclusion was the realization that any such change would create conditions tending to defeat the purposes of the National Industrial Recovery Act with respect to the reemployment of workers and the creation of conditions of fair competition.

Individual producers of steel products would be affected in very different ways by any action discontinuing the basing point method of quoting prices for their products. Any producer operating a plant in or close to important markets for steel products would probably find himself enjoying a practical monopoly of that market, at least up to the point of the ability of his plant to produce, and, if the extent of his capacity was not fully adequate to supply such market, there would be a strong tendency to expand such capacity to take care of all such requirements.

On the other hand, a producer operating a plant not advantageously located with respect to important markets would find his field of activity seriously restricted, with resulting inability to operate to any greater extent than the limited local demand would require. For such a producer the effect would be a shrinking of activity and probable abandonment of the no longer usable capacity.

Plants located in or near Detroit, for example, producing the classes of steel products consumed by automobile manufacturers, presumably would enjoy a virtual monopoly of the demand from that important market up to the limit of their ability to satisfy that demand. Producers located elsewhere presumably would not be able

to share in the demand from the automobile industry in Detroit and vicinity except when local mills were fully occupied and therefore unable to take on any additional orders. Mills located at other places, like Youngstown, Pittsburgh and Wheeling, which have been accustomed to share substantially in the demand from the automobile industry in Detroit and vicinity, presumably would be unable to participate in the Detroit orders until the local Detroit mills were fully employed.

Such conditions would tend definitely to localize the steel business and to create sharp inequalities of production and employment among the different members of the industry and different districts. In the Detroit district, for example, the capacity to produce all classes of steel products for sale is less than 1,000,000 tons a year, but the demand for steel products from consumers located in that district, when the automobile industry is at all active, is probably three or four times the ability of the local mills to produce.

In the district within a radius of 75 miles of Pittsburgh, on the other hand, there is probably a capacity of close to 20,000,000 tons a year of all classes

of steel products made for sale, but the demand from local consuming industries is probably not more than one-third of the capacity of the mills to produce.

The basing point method of quoting prices as now practised in the steel industry tends definitely to discourage quoting too high a price at any basing point because the higher the price at a given basing point the greater the inducement for mills located remote from that basing point to invade that market to compete for a share of whatever business may be offered, without having to face too much absorption of freight charges in order so to compete. For that reason, it may be said that although the basing point method may tend to create uniformity of prices for any product at any place of delivery, it, nevertheless, has a strong tendency to determine any such uniformity of prices at a comparatively low level. Any other method of quoting prices, on the other hand, would tend in exactly the opposite direction to encourage sharp differences in prices in different sections of the country and, in general, prices always as high as would be consistent with monopoly of local markets.

## Reports on Code Effects in Steel Industry

WASHINGTON, March 12.—After having declined to a low of 48.9c. an hr. in March, 1933, average wages in the iron and steel industry reached a peak of 64.6c. in November, 1934, according to a report just issued by the NRA Research and Planning Division on operations under the recovery act, which is designed to show beneficial results arising from codification. The table on hourly earnings in the iron and steel industry covers the years 1923, 1926, 1929, March, 1933, and November, 1934.

The entire report is made up of employment conditions and is a review of facts taken from numerous responsible sources. The hourly wages are taken from the National Industrial Conference Board. The average hours per week in the iron and steel industry during the pre-code period of January-June, 1933, were 29.5 and rose to 30.5 during the January-November, 1934, period, as shown by the Bureau of Labor Statistics. Taking 1929 as 100, average weekly earnings in the iron and steel industry since 1934 reached their highest point at 96.7 in June, rising from 59 in the January-April, 1933, period.

The average weekly payroll in the industry was \$23.86 in June, 1934, and dropped to \$17.43 in November, 1934, while in June, 1933, it was \$18.33. Monthly statistics

on employment are published in the report, covering the years 1930, 1931, 1932, 1933 and 1934, and mark the first time the Government has given out such data.

## Mechanical Stoker Sales Are Doubled

SALES of mechanical stokers have more than doubled in two years, the increase being mostly in small stokers installed in connection with residence and other small heating plants. Sales in 1934 by 83 stoker manufacturers were 21,253 units, as compared with 14,810 units in 1933 and with 9571 in 1932 as shown by statistics gathered by the Bureau of Census, U. S. Department of Commerce.

The total number of manufacturers, assemblers and primary distributors of stokers for bituminous and anthracite coal is estimated at 225. Of the 83 companies reporting, 62 manufacture stokers of less than 100 lb. of coal feed per hr., bringing into this classification stokers made for residential use. Sales reported in this classification in 1934 were 16,513 as compared with 11,070 in 1933 and 6783 in 1932. Of the manufacturers reporting 51 make stokers for apartment houses and small commercial heating plants with a capacity of 100 to 200 lb. of coal feed per hr. and their sales in 1934 were 1808 units as compared with 1047 in 1933 and 916 in 1932.

## Ford Sheet Mill to Start During June

DETROIT, March 12.—The Ford Motor Co. has given some steel releases for April delivery and will complete this week its purchases for next month's requirements. On account of comfortable stocks already on hand at Rouge, it is not buying much steel as previously anticipated. However, present plans call for the purchase of considerably larger steel tonnages next month for May production than are being bought at present.

Ford's new continuous sheet and cold-rolled mill will be completed in June and likely will start operating in that month. The usual period of breaking in the mills will take a month or two, during which the tonnage produced will be of negligible proportions. This means that the rolling of larger tonnages will not be possible until probably August or September so that practically all the sheet steel necessary for 1935 models will have to be purchased from commercial steel mills. Even if the increased capacity for steel-making at Dearborn were available today, Ford would still have to buy outside more than half its steel requirements while running at its current rate of over 6000 cars a day.

## General Electric Co. Employee Payments

PENSION payments aggregating \$2,600,000 were paid to retired employees of the General Electric Co. during 1934, according to W. W. Trench, secretary of the company. The General Electric Pension Trust now has assets of more than \$23,000,000 and the additional pension plan, to which employees themselves contribute, now has on hand approximately \$6,000,000 to the credit of some 45,000 employees.

Records of exceptional achievement by employees of General Electric have been revealed in awards by the Charles A. Coffin Foundation to 42 men and two women. These citations were for contributions by the recipients during 1934, to the progress and prestige of the company and to the advance of the electrical art. The 44 awards were given for 37 accomplishments, in six cases the awards being shared jointly by two or more persons.

Each citation consists of a certificate and a cash honorarium. The Charles A. Coffin Foundation has made annual awards since 1922, when it was established by the directors of the company as a tribute

to the late Charles Albert Coffin, its founder and first president.

Of the total number of employees honored this year, 15 were factory men; 20, engineers; five, commercial employees; three, administrative and clerical workers and one, a construction foreman. It was the first time when more than one woman has received an award, and it was the year standing second highest, in the number of individuals honored since the establishment of the Foundation.

A keener interest in learning to do their jobs a better way netted General Electric employees \$29,218 during 1934. The annual suggestion report of the company reveals that 11,438 suggestions were made by employees during the past year and that 3736 of these were adopted. Nearly \$475,000 has been given to various employees for accepted suggestions under the award system in effect at all works of the company since 1926. The largest single award ever made was \$1,200, while the average recompense for adopted ideas is about \$10.

## Higher Rates Lower Workers' Annual Income

The outcome of higher wage rates and shorter working hours is the most striking reduction in the real incomes of wage-earners in thirty years, according to a recent booklet-editorial of Farrel-Birmingham Co., Inc., "Labor's Opportunity to Promote Recovery." The authors, Allen W. Rucker and N. W. Pickering, president of the company, show from official figures of the 1933 U. S. Census of Manufactures, that:

For each \$100,000 of value added by manufacture, nine major employing industries, including automobiles, steel, and cotton textiles, employed an average of 4.5 more men than in 1931;

The percentage of value added paid as wages remained the same in 1933 as in 1931, or 43.3 per cent, despite higher wage rates;

Consequently, with more men over which to distribute the same share of values created, the average annual income per worker was reduced \$222; the decline in real wages or purchasing power was 11.7 per cent from that of 1931.

"For the first time in 30 years," say the authors, "the real income of employed wage-earners failed to make a substantial gain in a depression year. In the depression year of 1921, the real income per average worker increased 44 per cent; in the depression year of

1931, the real income per employed worker rose 18.5 per cent over the boom year of 1929. For those wage-earners and industrialists who held hope that shorter hours and higher wage rates without a corresponding increase in productivity would increase purchasing power, the 1933 Census of Manufactures tells a sorry story. These figures are devoid of both sentiment and theory; they tell only what actually happened. It matters little that the average hourly wage of thousands of workers was increased; it matters little that total payrolls increased. None of these are important in the face of a sharp reduction in the annual income per worker employed and a sharp rise in the price of merchandise he must buy. Artificial increases in wage rates without corresponding increases in productivity, rebound with terrific force upon the people who are supposed to be benefited—the workers themselves—as well as upon industry and public alike.

"Active business depends upon balanced prices. If modification in wage rates and working hours sufficient to lower production costs to the level of incomes are made, business volume would speedily increase enough to absorb unemployment as well as yield higher annual dollar incomes for all. If Labor will cooperate with industry and government to effect these modifications in costs and prices, all else follows—fair prices to consumers, high annual incomes to workers and jobs by the millions. Now is the time and the opportunity for Labor to promote recovery by assisting in such essential moves."

## Locomotive Axle and Wheel Research

UNDER the above title, Timken Roller Bearing Co., Canton, Ohio, has recently issued a comprehensive and valuable research covering stresses arising from press fits. Although the paper, originally presented before the Engineers' Society of Western Pennsylvania by T. V. Buckwalter, vice-president of the Timken Co., relates primarily to railroad axles and wheels, the information made available can be applied to any type of shaft or axle where bending stresses are restrained by pressed on units.

Comprehensive fatigue test data covering carbon and alloy steel axles are given in chart form as well as a large number of photo-elastic studies.



# Monthly Report of Metal Working Activity

These Data Are Assembled By THE IRON AGE From Recognized Sources And Are Changed Regularly As More Recent Figures Are Made Available. Boldface Type Indicates Changes This Week

	February, 1935	January, 1935	February, 1934	Two Months, 1935	Two Months, 1934
<b>Raw Materials:</b>					
Lake ore consumption (gross tons)*.....		<b>2,269,525</b>	1,727,746		3,338,149
Coke production (net tons) <sup>b</sup> .....		2,889,552	2,622,594		5,206,279
<b>Pig Iron:</b>					
Pig iron output—monthly (gross tons) <sup>c</sup> .....	<b>1,608,552</b>	1,477,336	1,263,673	3,085,888	2,478,899
Pig iron output—daily (gross tons) <sup>c</sup> .....	<b>57,448</b>	47,656	45,131	52,303	42,016
<b>Castings:</b>					
Malleable castings—production (net tons) <sup>d</sup> .....		43,400	33,939		64,356
Malleable castings—orders (net tons) <sup>d</sup> .....		44,568	36,594		69,095
Steel castings—production (net tons) <sup>d</sup> .....			28,526		56,170
Steel castings—orders (net tons) <sup>d</sup> .....			35,698		61,994
<b>Steel Ingots:</b>					
Steel ingot production—monthly (gross tons)*..	<b>2,742,125</b>	2,834,170	2,182,826	5,576,295	4,154,247
Steel ingot production—daily (gross tons)*...	<b>114,255</b>	104,969	90,951	109,339	81,456
Steel ingot production—per cent of capacity*..	<b>51.61</b>	47.67	41.31	49.66	36.99
<b>Employment in Steel Industry:</b>					
Total employees*.....		407,071	403,298		398,155
Total payrolls (thousands of dollars)*.....		44,328	35,425		35,151
Average hours worked per week*.....		33.6	33.1		31.6
<b>Finished Steel:</b>					
Trackwork shipments (net tons)*.....	<b>2,892</b>	2,333	3,310	5,225	6,121
Sheet steel sales—(net tons)*.....		321,831	184,355		393,818
Sheet steel production (net tons)*.....		235,714	194,830		358,452
Fabricated shape orders (net tons)*.....		55,857	75,294		166,888
Fabricated shape shipments (net tons)*.....		85,950	47,509		125,132
Fabricated plate orders (net tons) <sup>d</sup> .....		18,778	14,641		30,538
Reinforcing bar awards (net tons)*.....	<b>22,265</b>	15,600	17,625	37,865	35,425
U. S. Steel Corp'n. shipments (tons) <sup>h</sup> .....	<b>583,137</b>	534,055	385,500	1,117,292	717,277
Ohio River Steel Shipments <sup>hh</sup> .....		52,656	4,373		58,142
<b>Fabricated Products:</b>					
Automobile production U. S. and Canada <sup>dd</sup> .....	<b>*355,350</b>	303,372	240,278	*658,722	404,089
Construction contracts (37 Eastern States) <sup>i</sup> .....		\$99,773,900			
Steel barrel shipments (number) <sup>d</sup> .....		<b>437,442</b>	572,915		1,279,262
Steel furniture shipments <sup>d</sup> .....		<b>\$1,139,497</b>	\$894,076		\$1,890,914
Steel boiler orders (sq. ft.) <sup>d</sup> .....			227,093		462,869
Locomotive orders (number) <sup>k</sup> .....	<b>1</b>	0	20	1	20
Freight car orders (number) <sup>k</sup> .....	<b>806</b>	24	20,227	830	20,377
Machine tool index <sup>l</sup> .....		65.5	50.9		
<b>Foreign Trade:</b>					
Imports of pig iron (gross tons) <sup>m</sup> .....		<b>2,033</b>	10,777		22,663
Imports of rolled steel (gross tons) <sup>m</sup> .....		<b>14,180</b>	6,456		13,639
Exports of all rolled steel and iron (gross tons) <sup>m</sup> ..		<b>69,491</b>	74,968		165,393
Exports, finished steel (gross tons) <sup>m</sup> .....		<b>66,523</b>	68,722		147,540
Exports of scrap (gross tons) <sup>m</sup> .....		<b>186,112</b>	75,884		163,156
<b>British Production:</b>					
British pig iron production (gross tons) <sup>n</sup> .....		521,200	414,400		855,700
British steel ingot production (gross tons) <sup>n</sup> .....		757,800	707,500		1,542,000
<b>Non-Ferrous:</b>					
Lead production (net tons) <sup>o</sup> .....		30,674	34,349		72,919
Lead shipments (net tons) <sup>o</sup> .....		34,164	25,778		59,689
Zinc production (net tons) <sup>p</sup> .....	<b>33,072</b>	35,614	30,296	68,686	63,373
Zinc shipments (net tons) <sup>p</sup> .....	<b>34,903</b>	35,538	32,485	70,441	59,141
Deliveries of tin (gross tons) <sup>r</sup> .....	<b>3,905</b>	4,600	2,940	8,505	6,250

\*Preliminary.

Sources of figures: \* Lake Superior Iron Ore Association; <sup>b</sup> Bureau of Mines; <sup>c</sup> THE IRON AGE; <sup>d</sup> Bureau of the Census; <sup>dd</sup> When preliminary, from Automobile Manufacturers' Association—Final figures from Bureau of the Census; <sup>e</sup> American Iron and Steel Institute; <sup>f</sup> National Association of Flat-Rolled Steel Manufacturers; <sup>g</sup> American Institute of Steel Construction; <sup>h</sup> United States Steel Corp'n.; <sup>hh</sup> U. S. Engineer, Pittsburgh; <sup>i</sup> F. W. Dodge Corp'n.; <sup>j</sup> Railway Age; <sup>k</sup> National Machine Tool Builders Association; <sup>l</sup> Department of Commerce; <sup>m</sup> British Iron and Steel Federation; <sup>n</sup> American Bureau of Metal Statistics; <sup>o</sup> American Zinc Institute, Inc.; <sup>p</sup> New York Commodities Exchange.



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## SUMMARY OF THIS WEEK'S BUSINESS

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# Political Uncertainties Cast Pall of Gloom Over Market

Steel Ingot Output Recedes to 47½ Per Cent and Scrap Composite Drops To \$11.17—Demand for Heavy Products Improves

RESUMING the decline interrupted a week ago, steel ingot output has receded from 48½ to 47½ per cent of capacity. Light flat rolled steel production is holding at a high rate, with tin plate and sheet mill operations averaging 75 per cent of capacity, but it is becoming increasingly evident that the needs of the automotive industry, so conspicuous a few weeks ago, are no longer urgent. Makers of full-finished sheets are booked full for the remainder of this month and some of them have good commitments for April, but few steel producers have accumulated enough forward tonnage to forestall a sharp reduction in their backlogs with the arrival of the first quarter shipping deadline on March 31.

Steel buying for the second quarter, aside from a brief spurt early this month, has been desultory. Though the decline in demand from the motor car makers is now attributed to inventory accumulations rather than to a downward revision of production programs, the lack of interest among other classes of buyers is bluntly ascribed to political uncertainties.

CURRENT gestures threatening the abolition of NRA, or at least all forms of code price control, have accentuated caution among buyers. Watchful waiting has also been encouraged by the introduction of the Bankhead-Huddleston bill proposing the abolition of price basing points other than the place of production, and by the knowledge that the reports of the NIRA and the Federal Trade Commission regarding the steel basing point system are about to be released. Those interested primarily in construction are concerned over repeated delays in the enactment of the new public works bill. The broad regulatory features of the proposed Eastman bill are holding back latent demands for barge construction and repairs. The Wagner labor disputes measure is feared because of its probable disturbing effect on industrial relations.

ENCOURAGING factors are a gain in the volume of steel orders from makers of household equipment, a sustained flow of business from the farm equipment and tractor industry, the placing of additional rail orders and the early maturity of a number of large pending public projects.

The New York Central has bought 20,000 tons of rails and the Union Pacific has closed for 19,000 tons. The Burlington is considering the use of high-tensile

steels in the construction of 500 freight cars, which it will soon undertake in its own shops. The Wheeling & Lake Erie will build five locomotives. The Chicago & North Western will sell 5500 old freight cars for scrap.

Structural steel awards of 6450 tons include 1300 tons for a Ford glass plant at Dearborn, Mich. New projects of 22,110 tons compare with 16,300 tons last week and 8500 tons two weeks ago. The outstanding new job calls for 10,300 tons for a strip mill for the Great Lakes Steel Corp., Ecorse, Mich. Bids go in this week on 33,000 tons for the Tri-borough bridge, New York.

BIDS on 16,110 tons of steel for the Fort Peck, Mont., dam, including 11,168 tons of reinforcing bars, 4317 tons of structural steel, 115 tons of steel sealing strips and 510 tons of miscellaneous steel, will be taken April 3. Tenders on Mississippi dam No. 26, calling for 6000 tons of structural steel, 1400 tons of reinforcing bars and 230,000 sq. ft. of steel sheet piling, will be received April 11. Two Chicago sewer projects will take 11,750 tons of concrete bars.

Chicago has awarded 3200 tons of cast iron pipe and takes figures this week on 2100 tons. A Youngstown mill has booked 10,000 tons of seamless steel pipe for a 250-mile oil line from Oklahoma to Nebraska.

SCRAP, though lethargic in most markets, has lost further ground at Pittsburgh and Philadelphia, and THE IRON AGE scrap composite has receded from \$11.50 to \$11.17 a ton. Weakness is attributable to general uncertainty as to the course of steel production, to impending increases in the flow of scrap with the opening of Lake navigation and to the expanding output of industrial grades of old material in the face of lower scrap consumption.

Steel output is off four points to 51 per cent at Chicago, two points to 34 per cent in the Philadelphia district and two points to 61 per cent in the Cleveland-Lorain area. Operations are up one point to 51 per cent in the Valleys and five points to 85 per cent in the Wheeling district.

THE IRON AGE composites for pig iron and finished steel are unchanged at \$17.90 a ton and 2.124c. a lb. respectively. Rivet prices have been reaffirmed for the second quarter.

# A Comparison of Prices

Market Prices at Date, and One Week, One Month, and One Year Previous  
Advances Over Past Week in Heavy Type, Declines in Italics

## Pig Iron

Per Gross Ton:	Mar. 12, 1935	Mar. 5, 1935	Feb. 12, 1935	Mar. 13, 1934
No. 2 fdy., Philadelphia.....	\$20.26	\$20.26	\$20.26	\$19.26
No. 2, Valley furnace.....	18.50	18.50	18.50	17.50
No. 2 Southern, Cin'ti.....	19.13	19.13	19.13	18.13
No. 2, Birmingham†.....	14.50	14.50	14.50	13.50
No. 2 foundry, Chicago*.....	18.50	18.50	18.50	17.50
Basic, del'd eastern Pa.....	19.76	19.76	19.76	18.76
Basic, Valley furnace.....	18.00	18.00	18.00	17.00
Valley Bessemer, del'd P'gh.	20.76	20.76	20.76	19.76
Malleable, Chicago*.....	18.50	18.50	18.50	17.50
Malleable, Valley.....	18.50	18.50	18.50	17.50
L. S. charcoal, Chicago.....	24.04	24.04	24.04	23.54
Ferromanganese, seab'd car-lots	85.00	85.00	85.00	85.00

†This quotation is for delivery in South; in the North prices are 38c. a ton under delivered quotations from nearest Northern furnace.

\*The switching charge for delivery to foundries in the Chicago district is 60c. per ton.

## Rails, Billets, etc.

Per Gross Ton:	Mar. 12, 1935	Mar. 5, 1935	Feb. 12, 1935	Mar. 13, 1934
Rails, heavy, at mill.....	\$36.37 ½	\$36.37 ½	\$36.37 ½	\$36.37 ½
Light rails, Pittsburgh.....	35.00	35.00	35.00	32.00
Rerolling billets, Pittsburgh.	27.00	27.00	27.00	26.00
Sheet bars, Pittsburgh.....	28.00	28.00	28.00	26.00
Slabs, Pittsburgh.....	27.00	27.00	27.00	26.00
Forging billets, Pittsburgh..	32.00	32.00	32.00	31.00
Wire rods, Pittsburgh.....	38.00	38.00	38.00	36.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb..	1.70	1.70	1.70	1.60

## Finished Steel

Per Lb.:	Cents	Cents	Cents	Cents
Bars, Pittsburgh.....	1.80	1.80	1.80	1.75
Bars, Chicago.....	1.85	1.85	1.85	1.80
Bars, Cleveland.....	1.85	1.85	1.85	1.80
Bars, New York.....	2.13	2.13	2.13	2.08
Plates, Pittsburgh.....	1.80	1.80	1.80	1.70
Plates, Chicago.....	1.85	1.85	1.85	1.75
Plates, New York.....	2.08	2.08	2.08	1.98
Structural shapes, Pittsburgh	1.80	1.80	1.80	1.70
Structural shapes, Chicago...	1.85	1.85	1.85	1.75
Structural shapes, New York	2.05 ¼	2.05 ¼	2.05 ¼	1.95 ¼
Cold-finished bars, Pittsburgh	2.10	2.10	2.10	2.10
Hot-rolled strips, Pittsburgh.	1.85	1.85	1.85	1.75
Cold-rolled strips, Pittsburgh	2.60	2.60	2.60	2.40

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our detailed price tables. †Blue Eagle copper.

## Finished Steel

Per Lb.:	Mar. 12, 1935	Mar. 5, 1935	Feb. 12, 1935	Mar. 13, 1934
Hot-rolled annealed sheets, No. 24, Pittsburgh.....	2.40	2.40	2.40	2.25
Hot-rolled annealed sheets, No. 24, Gary.....	2.50	2.50	2.50	2.35
Sheets, galv., No. 24, P'gh...	3.10	3.10	3.10	2.85
Sheets, galv., No. 24, Gary..	3.20	3.20	3.20	2.95
Hot-rolled sheets, No. 10, P'gh	1.85	1.85	1.85	1.75
Hot-rolled sheets, No. 10, Gary	1.95	1.95	1.95	1.85
Wire nails, Pittsburgh.....	2.60	2.60	2.60	2.35
Wire nails, Chicago dist. mill	2.65	2.65	2.65	2.40
Plain wire, Pittsburgh.....	2.30	2.30	2.30	2.20
Plain wire, Chicago dist. mill	2.35	2.35	2.35	2.25
Barbed wire, galv., P'gh.....	3.00	3.00	3.00	2.85
Barbed wire, galv., Chicago dist. mill.....	3.05	3.05	3.05	2.90
Tin plate, 100 lb. box, P'gh.	\$5.25	\$5.25	\$5.25	\$5.25

## Scrap

Per Gross Ton:	Mar. 12, 1935	Mar. 5, 1935	Feb. 12, 1935	Mar. 13, 1934
Heavy melting steel, P'gh...	\$12.25	\$12.75	\$13.25	\$14.50
Heavy melting steel, Phila...	10.50	11.00	11.75	12.00
Heavy melting steel, Ch'go...	10.75	10.75	11.50	12.50
Carwheels, Chicago.....	11.00	11.00	12.00	12.25
Carwheels, Philadelphia.....	12.50	12.50	12.50	13.00
No. 1 cast, Pittsburgh.....	12.75	13.25	13.75	13.75
No. 1 cast, Philadelphia.....	11.00	11.00	11.00	13.25
No. 1 cast, Ch'go (net ton)...	9.50	9.50	10.00	9.50
No. 1 RR. wrot., Phila.....	11.00	11.00	11.25	11.00
No. 1 RR. wrot., Ch'go (net)	8.50	8.75	9.50	9.50

## Coke, Connellsville

Per Net Ton at Oven:	Mar. 12, 1935	Mar. 5, 1935	Feb. 12, 1935	Mar. 13, 1934
Furnace coke, prompt.....	\$3.85	\$3.85	\$3.85	\$3.50
Foundry coke, prompt.....	4.60	4.60	4.60	4.25

## Metals

Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Electrolytic copper, refinery†.	8.75	8.75	8.75	7.75
Lake copper, New York†.....	9.12 ½	9.12 ½	9.12 ½	8.00
Tin (Straits), New York....	46.80	47.37 ½	50.75	54.35
Zinc, East St. Louis.....	3.90	3.90	3.70	4.37 ½
Zinc, New York.....	4.25	4.25	4.05	4.72 ½
Lead, St. Louis.....	3.40	3.40	3.35	3.90
Lead, New York.....	3.55	3.55	3.50	4.00
Antimony (Asiatic), N. Y...	14.50	14.50	14.50	7.50

# The Iron Age Composite Prices

## Finished Steel

March 12, 1935	2.124c. a Lb.
One week ago	2.124c.
One month ago	2.124c.
One year ago	2.008c.

Based on steel bars, beams, tank plates, wire, rails, black pipe, sheets and hot-rolled strips. These products make 85 per cent of the United States output.

	High	Low	
1934 .....	2.199c., April 24;	2.008c., Jan. 2	
1933 .....	2.015c., Oct. 3;	1.867c., April 18	
1932 .....	1.977c., Oct. 4;	1.926c., Feb. 2	
1931 .....	2.037c., Jan. 13;	1.945c., Dec. 29	
1930 .....	2.273c., Jan. 7;	2.018c., Dec. 9	
1929 .....	2.317c., April 2;	2.273c., Oct. 29	
1928 .....	2.286c., Dec. 11;	2.217c., July 17	
1927 .....	2.402c., Jan. 4;	2.212c., Nov. 1	

## Pig Iron

\$17.90 a Gross Ton
17.90
17.90
16.90

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

	High	Low	
1934 .....	17.90, May 1;	16.90, Jan. 27	
1933 .....	16.90, Dec. 5;	13.56, Jan. 3	
1932 .....	14.81, Jan. 5;	13.56, Dec. 6	
1931 .....	15.90, Jan. 6;	14.79, Dec. 15	
1930 .....	18.21, Jan. 7;	15.90, Dec. 16	
1929 .....	18.71, May 14;	18.21, Dec. 17	
1928 .....	18.59, Nov. 27;	17.04, July 24	
1927 .....	19.71, Jan. 4;	17.54, Nov. 1	

## Steel Scrap

\$11.17 a Gross Ton
11.50
12.17
13.00

Based on No. 1 heavy melting steel quotations at Pittsburgh, Philadelphia and Chicago.

	High	Low	
1934 .....	13.00, Mar. 13;	9.50, Sept. 25	
1933 .....	12.25, Aug. 8;	6.75, Jan. 3	
1932 .....	8.50, Jan. 12;	6.42, July 5	
1931 .....	11.33, Jan. 6;	8.50, Dec. 29	
1930 .....	15.00, Feb. 18;	11.25, Dec. 9	
1929 .....	17.58, Jan. 29;	14.08, Dec. 3	
1928 .....	16.50, Dec. 31;	13.08, July 2	
1927 .....	15.25, Jan. 11;	13.08, Nov. 22	

# Steel Buying Slumps In Pittsburgh District



But Local Ingot Output Is Unchanged  
at 37 Per Cent While Valley and  
Wheeling District Rates Are Higher—  
Scrap Declines

**P**ITTSBURGH, March 12.—Steel buying for second quarter since March 1 reflects no general pressure of consumer requirements beyond the close of March. A few orders are drifting in for April and May delivery for full-finished sheets for automobile consumption, and tin plate specifications likewise assure producers of sustained activity beyond the close of first quarter. But in few instances have steel producers been able to cull enough forward tonnage to offset the decreasing backlogs which will be drastically depleted by the first quarter shipping deadline on March 31.

The possibility of a 60-day suspension of bituminous coal mine operations beginning April 1 apparently has caused little or no anxiety among steel consumers, as indicated by the tenor of current demand.

Greater attention unquestionably is being directed to national legislation which would have a more far-reaching effect upon industry than would a temporary labor contingency. The early fortunes of the Pittsburgh steel district will be influenced greatly by the disposition of the pending works relief bill which will, if passed, stimulate demand for heavy constructional steel.

For the third consecutive week steel ingot production in the Pittsburgh district is holding at 37 per cent. Output in the Valleys and nearby northern Ohio mills is up one point to 51 per cent. Raw steel production in the Wheeling district, which is engaged largely on tin plate and flat steel rolling, is five points higher at 85 per cent.

Sheet mills and tin plate mills have increased schedules this week to 75 per cent, while strip steel production is slightly lower, at about 60 per cent.

Scrap in the Pittsburgh district has weakened, with prices averaging 50c. a ton lower.

## Pig Iron

With the rate of foundry melt still far below normal, the move-

ment of pig iron continues to be sluggish. Heating equipment manufacturers are the only group maintaining fair melting schedules. Air brake manufacturers have not yet realized many orders from the much heralded program to reequip freight cars with new type brakes. Other railroad equipment makers maintaining foundries, though enjoying improved business, have not increased their takings of pig iron. Ingot mold orders are falling off. Furnace backlogs are a week-to-week affair, with little tonnage thus far entered for second quarter shipment.

## Semi-Finished Steel

Sheet bar demand continues at a fairly high rate, while that for slabs and billets is lagging. Bars for tin plate conversion and also for sheet rolling at some non-integrated mills are moving briskly. A renewed interest in forging stock is believed in the making from shops expecting to benefit from further buying by the automotive industry. Skelp and tube rounds are only moderately active for detached mill consumption.

## Bolts, Nuts and Rivets

Demand has not improved since the announcement of advanced prices covering bolts and nuts for spot and second quarter business. A fair amount of specifying against lower priced first quarter contracts is expected.

## Rails and Track Accessories

The Louisville & Nashville Railroad is in the market for a tonnage of tie plates. The local rail mill probably will complete production of the Norfolk & Western rail order this week, and its rail rolling schedule consequently will be considerably slower, while its production of sheet bars will provide moderate engagement.

## Reinforcing Steel

Bids will be taken until April 3, by the United States Engineer Office, Kansas City, Mo., on about 10,000 tons of billet steel reinforcing for the Fort Peck dam spillway.

Further bids are in prospect for the Muskingum Valley Conservancy District. The extent of demand for road construction hinges upon the fate of the proposed Federal public works bill. Some reinforcing steel may be specified for an Army pier at Boston, plans for which probably will be issued soon. Plans are expected to be issued some time in April covering a dam at Alton, Ill.

## Cold-Finished Bars

Buying by the motor car makers is slightly heavier. Further important coverage at automotive centers for May assemblies is believed imminent. Jobbers are ordering with more freedom, but warehouse replenishments have not yet measured up to the usual seasonal proportions. Miscellaneous demand is steady.

## Plates and Shapes

The plate market lacks early prospects for marked improvement. The Commonwealth Edison Co. affiliate at Chicago has temporarily shelved its plans to purchase 24 standard coal barges and 16 covered cargo barges. Award of 12 sand and gravel barges at Charleston, W. Va., requiring about 900 tons of plates, probably will be made within the next fortnight, as the new bottoms are necessary to replace wooden equipment. The proposed Eastman bill for regulating transportation is considered a deterrent to a large amount of potential repair work and new barge construction. Railroad requirements and tank construction are not important outlets at the moment for plates.

A fairly substantial tonnage of shapes is in the offing for an Army pier at Boston and a dam at Alton, Ill., plans for which probably will be issued in April. The Great Lakes Steel Corp., Detroit, is taking bids on 10,300 tons for strip mill buildings. About 1300 tons was placed with McClintic-Marshall for a Ford Motor Co. plant at Dearborn, Mich.

## Tubular Products

Two pipe producers in this district have received orders totaling about 5000 tons, while a Youngstown district mill was awarded 3200 tons of 10½-in. o.d. seamless pipe by the General Petroleum Corp., Los Angeles. The same Youngstown producer took an order last week for about 10,000 tons of 6½-in. o.d. seamless pipe for prompt delivery to the Champlin Refining Co., Enid, Okla., for a 250-mile line from Oklahoma to Superior, Neb. In virtually all other directions, oil-country demand



seems to be quieter. Mechanical tubing still is moving regularly to automotive centers. Railroads appear to be buying tubing more liberally in carload lots. Large producers report March shipments of all tubular goods, excepting oil-country material, on a par with the same February weeks. Shipments against recently taken orders, however, probably will bring the March total slightly above that for last month.

#### Bars

Orders are becoming more plentiful from automotive sources, and, although there yet is no evidence of a renewed buying wave for motor car consumption, bar producers are predicting rather freely that important coverage will be in force either late in March or early April. No further contraction in the volume of shipments to miscellaneous consumers is perceptible. Farm implement makers, though not specifying for unusually heavy shipments, are taking a notably regular flow of bars.

#### Wire

Specifications for manufacturers' wire for automotive consumption are appearing in rather moderate volume. A slight improvement is reported in jobber demand, but the movement to warehouses has not reached the usual early spring pace. Interest from the farm areas in spring requirements is rather casual.

#### Sheets

Heavy releases of full-finished sheets for auto body makers have sustained operations for the sheet industry at about 75 per cent. Some sheet units are booked solidly until March 31, and have already taken enough business to assure fairly satisfactory operations in the first half of April. Business for shipment well into second quarter is limited.

#### Tin Plate

Can makers continue to specify heavily against contracts, and the movement of tin plate appears to be reaching a representative rate for a peak season. In the current week, output probably will average slightly higher at 75 per cent. The bulk of current production is against actual releases. There is unquestionably a fair stocking movement of tin plate by can manufacturers. The small carry-overs at the beginning of this year, however, have necessitated the supplementing of stocks in readiness for seasonal packs.

#### Strip Steel

Specifications from the automotive industry are less urgent than

they were several weeks ago. Some orders are being received for April shipment, and in unusual instances for May. Backlogs, however, are declining with the approach of first quarter shipping deadline on March 31. Production for the strip industry this week is tending downward at about 60 per cent. A check to the declining trend is expected to be provided by prospective releases for Chevrolet assemblies. Miscellaneous demand is fairly well sustained.

#### Coke and Coal

Large independent bituminous mine production has increased steadily during the past two months, and output for the western Pennsylvania area has reached a point where unwieldy surpluses have accumulated. Production at small independent mines, however, has not been so heavy. The rising output at the larger mines is interpreted as an accumulation of anticipatory supplies for any labor contingencies that may arise on April 1. Heavy stocks in consumers' hands, however, are tending to minimize the importance of suspensions. The foundry and furnace

coke market remains featureless and nominally unchanged.

#### Scrap

Prices have drifted lower, with most grades off 50c. a ton. Ordinary No. 1 heavy melting steel was sold at \$12.50, delivered, Pittsburgh district, late last week, and dealers are now freely offering to sell at that figure. No. 1 steel, consequently, this week is quotable at \$12 to \$12.50. Although small yard supplies of heavy melting steel are not appearing in unusually heavy quantities at the lower prices now prevailing, there is no definite shortage in any grade of scrap. The weak position of the scrap market is traceable chiefly to several broad influences. The flow of scrap for domestic consumption will become easier upon the opening of Lake navigation, which this year will be unusually early. Production of industrial grades is increasing in the face of lower scrap consumption. Moreover, the general uncertainty of the early course of steel activity in the Pittsburgh district has dampened interest in scrap coverage for the time being. No. 1 heavy melting steel in the Youngstown district is plentiful at \$12.50, delivered consumer's yard.

### General Sheet Demand Up at Cincinnati

CINCINNATI, March 12.—Moderate improvement in general sheet demand has tended to offset easing of automotive requirement. While bookings from the Detroit area are lower, they are still equal to their normal proportion of one-third of district mill business. The continual improvement in general ordering, particularly from refrigerator, stove and household equipment manufacturers, is a buoyant feature of the market. Operations are above 90 per cent of capacity and current business indicates no downward change in district rolling schedules before June 1. Backlogs are expanding slowly and now equal a little more than two weeks' operations. Jobbing demand has shown an off-season decline.

Pig iron orders of more than 100 tons are rare, but the general volume of spot business is undiminished. Shipments so far this month have kept pace with the February rate. Southern iron is moving in better volume, the week's bookings totaling 500 tons, among which was a 200-ton order from Indiana. Jobbing foundries are generally slow,

but specialty melters report good operations. Some consumers have carried moderate inventories from first quarter, and the absence of price incentive is retarding anticipatory business.

Foundry coke shipments have eased from the February level, as users keep fuel needs abreast of business. The bulk of current business is for 30-day needs.

The district scrap market tends softer. The sale of a quantity of miscellaneous material has reflected mill insistence on price concessions. Some No. 2 steel is moving into the Pittsburgh district as dealers seek an outlet for their yard supplies. Bids have been reduced 25c. on all items this week and dealers are wary of short sales.

The Timken Roller Bearing Co., Canton, Ohio, has just received the order for steel mill bearings in connection with the new Zaporozstal steel mill recently ordered for the U.S.S.R. by the Amtorg Trading Corp. from the United Engineering & Foundry Co., Pittsburgh. It is estimated that approximately 1500 Timken bearings, weighing approximately 200 tons, will be used in this Russian mill.

# Chicago Output Is Down Four Points to 51 Per Cent



Decline Is Due to Recession in Automobile Specifications—Union Pacific Buys Rails—Burlington May Build Light-Weight Cars

**C**HICAGO, March 12. — The automobile industry is again a drag on ingot output, which is down four points to 51 per cent of capacity. Curtailment in automobile production does not appear to be the determining factor, but rather the fact that inventories are of such size and completeness that mill orders can be slackened.

In opposition to this trend among automobile manufacturers is greater use of structural steel, a better movement of reinforcing bars, steady consumption of steel by the miscellaneous trade and a further slight gain in production by agricultural implement makers who, as evidenced by their specifications, have not stocked to any large degree. The pull on tractor schedules is unchanged and farmers are beginning to order other types of machinery needed in the spring.

The rail market shows more signs of life, the Union Pacific having ordered 19,000 tons. A rail mill is now operating and pending tonnages are more encouraging. More steel is moving to railroad shops, which as a whole are expanding car repairs. The Burlington car building program is being held back while designs calling for lighter-weight cars are being discussed. The wrecking of old equipment continues with the offer for sale of 5500 cars by the Chicago & North Western.

The scrap market is extremely quiet and is moving within very narrow limits.

## Pig Iron

Second quarter contracting is gaining headway and in the first 10 days of March exceeded the total in the corresponding period of December. However, the movement is disappointing to sellers. March shipments are running slightly better than the early movement in February. Automotive foundries in western Michigan are slackening their pace, but stove and agricultural implement plants are holding all gains.

## Rails

Demand has finally started to grow and sellers are heartened in the belief that rollings, though small, may be continued throughout

the early spring. One mill was put in service on Monday. The Union Pacific is reported to have ordered a total of 19,000 tons, distribution of which has not yet been announced. Orders for 20,000 tons have been placed by the New York Central, which will also order about 5000 tons of fastenings. It is reported that the Chicago Great Western is about to close for 5000 tons, and the Chicago & North Western is now mentioned as an early buyer. Orders for track accessories are in such volume as is needed for current maintenance work.

## Sheets

Second quarter buying is slowly spreading and both sales and specifications have improved after having been rather light for about two weeks. Deliveries are giving less trouble, although improvement in this respect is not great.

## Cold Rolled Strip

Shipments remain steady to practically all consuming industries. Strip sheet mills are still pressed to meet deliveries.

## Bars

Demand for bar mill products is steady in practically all directions. Miscellaneous consumption continues to spread and farm implement manufacturers, who have not built large inventories, show no disposition to reduce their specifications. On the other hand, releases from automobile centers are lighter, and producers here believe that this situation arises from the fact that most automobile builders have accumulated sizeable stocks.

## Structural Material

Awards reach the satisfying total of 7000 tons, but inquiries have fallen back to less than 3000 tons. Among awards are several industrial plants, the largest of which is the Ford glass unit at Dearborn, Mich. The largest inquiries are for State highway bridge work.

## Plates

Plate business is still scattered and in the aggregate is small. Dam gates are being ordered at several of the Government projects, as at Sheffield, Ala., and at Bonneville,

Ore. It is understood that the Burlington is redesigning its contemplated freight cars and will make use, at least in part, of some of the new high-strength steels.

## Wire Products

Mixed weather is being given as the foremost cause of the slow movement of wire and wire products to country areas at a time when the first impulse of spring demand should be felt. Another factor appears to be the talk that is coming out of Washington as to high commodity prices. The farmer expects to benefit by what he sells, but he is also a buyer and, as such, he is disposed to be cautious. Second quarter inquiry is very light. Almost all orders are for immediate delivery, and consequently hold-ups are seldom encountered. Mills are well prepared for Southern distribution, but on the whole their stocks are not large. The movement of manufacturing lines is steady.

## Reinforcing Bars

The Sanitary District, Chicago, will have plans ready on March 28 for the Stickney sewage plant project, which will take 11,000 tons. There is also a west side intercepting sewer which calls for 750 tons. At Fort Peck, Mont., a new 11,000-ton inquiry is due for the dam spillway gate structure. This is exclusive of the 18,000 tons which was advertised several months ago. Two private projects of moderate size have been placed in Chicago, and the Goldblatt Department store tonnage is now estimated at 475 tons.

## Cast Iron Pipe

Chicago has ordered 3200 tons of 20 to 54-in. pipe from two producers, and is now advertising for 2100 tons of small sizes, bids on which will be opened March 15. On the whole, the market is resting in an in-between period when the weather is uncertain and not quite good enough for contractors to order out tonnages that will be needed in April. New plans for the Milwaukee filter plant disclose that the size of the project has been scaled down in order to get within the appropriation.

## Scrap

With the possible exception of malleable scrap moving to automobile foundries, this market is holding to its lazy ways of recent weeks. Dealer transactions are near the low of the year and the trade as a whole is centering its attention on the liquidation of old orders, which leads brokers to exert some pressure against dealers. The Chicago & North Western will dispose of 5500 old freight cars, but otherwise railroad offerings are light.



# Large Rail Order Placed In New York District



New York Central Places 20,000 Tons  
—Steel Demand in General Shows  
Further Contraction—Political Uncer-  
tainty an Adverse Influence

**N**EW YORK, March 12.—The New York Central has ordered 20,000 tons of rails, placing 10,660 tons with Illinois Steel Co. and 9340 tons with Bethlehem Steel Co. The track fastenings, amounting to 9500 tons, have not yet been awarded.

The contract for a 48-in. steel pipe line in the Bronx, calling for 850 tons of plates, has been held up pending the completion of final arrangements for a PWA loan.

Tin plate releases are still in good volume, but demand for other finished steel products has fallen off. Projects involving long-term commitments are being postponed because of political uncertainties at Washington. Buyers, moreover, see no advantage in forward buying since they are protected against declines during the coming quarter. Indications that the NRA experiment may be abandoned in whole or in part are also encouraging the trade to stay out of the market and await developments.

Evidences of seasonal improvement in metal-working activity are slow to appear, although some of the railroad shops are operating at a better rate than a month or two ago.

## Pig Iron

The efforts of furnace representatives to secure sizable second quarter commitments have been fruitless thus far. Current bookings are for small lots, about equally divided between prompt and April-May delivery. Total sales in this territory amounted to about 2000 tons during the past week, as compared with 5000 tons in the preceding period, which included one forward sale of 3000 tons, and bookings of 1150 tons made in the weekly period a fortnight ago. Most jobbing foundries in this area are melting in unchanged volume, but there has been a noticeable slackening in the activity of stove foundries. Makers of machinery, however, report a sustained improvement in orders although this better business has not yet been translated into heavier iron orders.

## Reinforcing Steel

Private building is accounting for a moderate flow of small-lot bar orders, but practically no tonnage business is currently being placed. No sizable projects are in prospect for the near future. The one award of the week consisted of 250 tons to the Kalman Steel Corp. for an apartment house in the Bronx. The steel mesh market is exceptionally inactive, but sellers look for considerable improvement in the second quarter when new highway projects get under way.

## Scrap

In sympathy with major domestic centers, this exporting district continues to have a weak undertone. This condition is temporarily intensified here by the reduced volume of fresh export business being booked. England is not demanding new commitments at present, Japan is holding fresh purchases to a minimum, and the Italian decree to discourage imports has disorganized projected scrap sales to that country. However, local brokers are energetically collecting supplies to fill old export contracts. No. 1 and No. 2 steels are bringing \$9 and \$7.50 respectively, alongside barge, although somewhat higher bids are occasionally made for special lots or for particular competitive parcels. Steel car axles are now priced at \$13.75 on the strength of recent deliveries to a Jersey City user, and railroad wrought grades are 50c. lower.

## Steel Demand Fair At St. Louis

**S**T. LOUIS, March 12.—Reports of increasing activities among the implement, machinery and stove manufacturers in the St. Louis territory have been most gratifying to makers of pig iron. One large Illinois implement manufacturer reports an increase of

50 per cent in business, with the prospects that this will be the biggest year since 1928. A specialty concern reports heavy bookings. The stove interests in Belleville and vicinity have begun to step up their operations.

Business in finished iron and steel is reported as being fairly good. The movement of wire and pipe into the farming districts is slightly larger than it has been. Structural steel demand for private projects is in small volume. Demand from the railroads centering here is quiet.

Continued weakness in the scrap market has resulted in a further decline in the prices of some items. No. 1 and No. 2 heavy melting, No. 2 railroad wrought and rails for rolling are 25c. a ton off; and No. 1 machinery cast and cast iron car wheels are 50c. a ton lower. The Missouri Pacific list of 75 carloads closed yesterday.

## Railroad Business Aids Southern Mills

**B**IRMINGHAM, March 12.—Announcement was made last week that the Bessemer, Ala., plant of the Pullman Car & Mfg. Co. would build 600 steel, wood-lined, box cars for the National Railways of Mexico. Work on the order will start the latter part of the month. Back in 1930 the Bessemer plant also built 600 cars for the same line.

The Pullman plant has been in steady operation since October, following a shutdown of three years, and now will be able to continue its schedule for several months more. In the last few months the plant has built 100 phosphate cars and several hundred box cars for the Seaboard Air Line; also 200 hoppers for the Central of Georgia.

The general steel market is moving along fairly well, but with business mostly routine. Railroad tonnage has been the big factor in the current pick-up. Second quarter business is beginning to materialize, but not actively.

Thirteen open-hearths were worked last week and the schedule this week will probably be the same.

The pig iron market continues to follow a sluggish course, with a daily mixture of small spot orders and small contracts for early requirements. Some second quarter tonnage is being booked, but not much to date. The price remains at \$14.50.

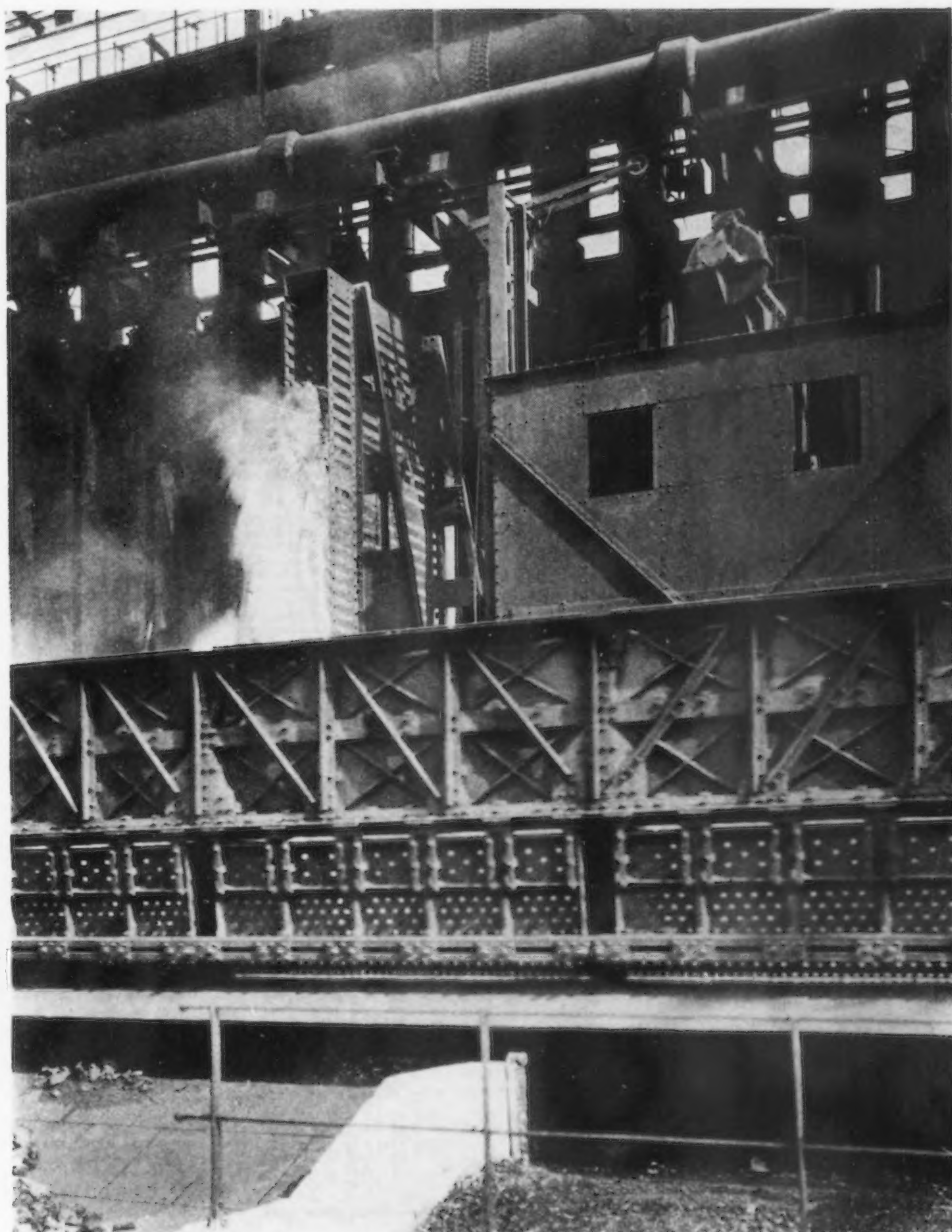


# PLANTS AND APPARATUS

## for PREPARING TREATING

## and HANDLING GAS AND COKE

## and BY-PRODUCTS



BY  
PRODUCT • COKE • PLANTS •

# KOPPERS CONSTRUCTION CO.

## KOPPERS BUILDING

## PITTSBURGH, PA.

THE IRON AGE, March 14, 1935—61

# Prices of Finished Steel and Iron Products

## BARS, PLATES, SHAPES

Iron and Steel Bars	
Soft Steel	Base per Lb.
F.o.b. Pittsburgh	1.80c.
F.o.b. Chicago	1.85c.
F.o.b. Gary	1.85c.
F.o.b. Duluth	1.95c.
Del'd Detroit	1.95c.
F.o.b. Cleveland	1.85c.
F.o.b. Buffalo	1.90c.
Del'd Philadelphia	2.09c.
Del'd New York	2.13c.
F.o.b. Birmingham	1.95c.
F.o.b. cars dock Gulf ports	2.20c.
F.o.b. cars dock Pacific ports	2.35c.

Rail Steel	
(For merchant trade)	
F.o.b. Pittsburgh	1.70c.
F.o.b. Chicago	1.75c.
F.o.b. Gary	1.75c.
F.o.b. Moline, Ill.	1.75c.
F.o.b. Cleveland	1.75c.
F.o.b. Buffalo	1.80c.
F.o.b. Birmingham	1.85c.
F.o.b. cars dock Gulf ports	2.10c.
F.o.b. cars dock Pacific ports	2.25c.

Billet Steel Reinforcing	
(Straight lengths as quoted by distributors)	
F.o.b. Pittsburgh	2.05c.
F.o.b. Chicago	2.10c.
F.o.b. Gary	2.10c.
Del'd Detroit	2.20c.
F.o.b. Cleveland	2.10c.
F.o.b. Youngstown	2.10c.
F.o.b. Buffalo	2.10c.
F.o.b. Birmingham	2.10c.
F.o.b. cars dock Gulf ports	2.45c.
F.o.b. cars dock Pacific ports	2.45c.

Rail Steel Reinforcing	
(Straight lengths as quoted by distributors)	
F.o.b. Pittsburgh	1.90c.
F.o.b. Chicago	1.95c.
F.o.b. Gary	1.95c.
F.o.b. Cleveland	1.95c.
F.o.b. Youngstown	1.95c.
F.o.b. Buffalo	1.95c.
F.o.b. Birmingham	1.95c.
F.o.b. cars dock Gulf ports	2.30c.
F.o.b. cars dock Pacific ports	2.30c.

Iron	
F.o.b. Chicago	1.80c.
F.o.b. Terre Haute, Ind.	1.75c.
F.o.b. Louisville, Ky.	2.10c.
F.o.b. Danville, Pa.	1.80c.
F.o.b. Berwick, Pa.	1.70c.

Cold Finished Bars and Shafting*	
Base per Lb.	
F.o.b. Pittsburgh	2.10c.
F.o.b. Chicago	2.15c.
F.o.b. Gary	2.15c.
F.o.b. Cleveland	2.15c.
F.o.b. Buffalo	2.20c.
Del'd Detroit	2.30c.
Del'd eastern Michigan	2.35c.

\* In quantities of 10,000 to 19,000 lb.

Fence and Sign Posts	
Angle Line Posts	
Base per Net Ton	
F.o.b. Pittsburgh	\$50.00
F.o.b. Chicago	50.00
F.o.b. Duluth	51.00
F.o.b. Cleveland	50.00
F.o.b. Birmingham	53.00
F.o.b. Houston, Orange, Beaumont, Galveston	59.00
F.o.b. Mobile	58.00
F.o.b. New Orleans, Lake Charles, Corpus Christi	59.00
F.o.b. cars dock Pacific ports	63.00

Plates	
Base per Lb.	
F.o.b. Pittsburgh	1.80c.
F.o.b. Chicago	1.85c.
F.o.b. Gary	1.85c.
Del'd Cleveland	1.95c.
F.o.b. Coatesville	1.90c.
F.o.b. Sparrows Point	1.90c.
Del'd Philadelphia	1.95c.
Del'd New York	2.08c.
F.o.b. Birmingham	1.95c.
F.o.b. cars dock Gulf ports	2.20c.
F.o.b. cars dock Pacific ports	2.35c.
Wrought iron plates, f.o.b. P'gh.	3.20c.

Floor Plates	
F.o.b. Pittsburgh	3.35c.
F.o.b. Chicago	3.40c.
F.o.b. Coatesville	3.45c.
F.o.b. cars dock Gulf ports	3.75c.
F.o.b. cars dock Pacific ports	3.90c.

Structural Shapes	
Base per Lb.	
F.o.b. Pittsburgh	1.80c.
F.o.b. Chicago	1.85c.
Del'd Cleveland	1.95c.
F.o.b. Buffalo	1.90c.
F.o.b. Bethlehem	1.90c.
Del'd Philadelphia	2.05c.
Del'd New York	2.05c.
F.o.b. Birmingham (standard)	1.95c.
F.o.b. cars dock Gulf ports	2.20c.
F.o.b. cars dock Pacific ports	2.35c.

## Steel Sheet Piling

Base per Lb.	
F.o.b. Pittsburgh	2.15c.
F.o.b. Chicago	2.25c.
F.o.b. Buffalo	2.25c.
F.o.b. cars dock Gulf ports	2.60c.
F.o.b. cars dock Pacific ports	2.60c.

## SHEETS, STRIP, TIN PLATE

### TERNE PLATE

Sheets	
Hot Rolled	Base per Lb.
No. 10, f.o.b. Pittsburgh	1.85c.
No. 10, f.o.b. Gary	1.95c.
No. 10, del'd Detroit	2.05c.
No. 10, del'd Phila.	2.14c.
No. 10, f.o.b. Birmingham	2.00c.
No. 10, f.o.b. dock cars Pacific ports	2.40c.

Hot-Rolled Annealed	
No. 24, f.o.b. Pittsburgh	2.40c.
No. 24, f.o.b. Gary	2.50c.
No. 24, del'd Detroit	2.60c.
No. 24, del'd Phila.	2.69c.
No. 24, f.o.b. Birmingham	2.55c.
No. 24, f.o.b. dock cars Pacific ports	3.05c.
No. 24, wrought iron, Pittsburgh	4.30c.

Heavy Cold-Rolled	
No. 10 gage, f.o.b. Pittsburgh	2.50c.
No. 10 gage, f.o.b. Gary	2.60c.
No. 10 gage, del'd Detroit	2.70c.
No. 10 gage, del'd Phila.	2.79c.
No. 10 gage, f.o.b. Birmingham	2.65c.
No. 10 gage, f.o.b. dock cars Pacific ports	3.10c.

Light Cold-Rolled	
No. 20 gage, f.o.b. Pittsburgh	2.95c.
No. 20 gage, f.o.b. Gary	3.05c.
No. 20 gage, del'd Detroit	3.15c.
No. 20 gage, del'd Phila.	3.24c.
No. 20 gage, f.o.b. Birmingham	3.10c.
No. 20 gage, f.o.b. dock cars Pacific ports	3.50c.

Galvanized Sheets	
No. 24, f.o.b. Pittsburgh	3.10c.
No. 24, f.o.b. Gary	3.20c.
No. 24, del'd Phila.	3.39c.
No. 24, f.o.b. Birmingham	3.25c.
No. 24, f.o.b. dock cars Pacific ports	3.70c.
No. 24, wrought iron, Pittsburgh	4.95c.

Long Terns	
No. 24, unassorted 8-lb. coating	
f.o.b. Pittsburgh	3.40c.
F.o.b. cars dock Pacific ports	4.10c.

Vitroous Enameling Stock	
No. 20, f.o.b. Pittsburgh	3.10c.

Tin Mill Black Plate	
No. 28, f.o.b. Pittsburgh	2.75c.
No. 28, Gary	2.85c.
No. 28, cars dock, Pacific Coast	3.35c.

Tin Plate	
Per Base Box	
Standard cokes, f.o.b. P'gh district mill	\$5.25
Standard cokes, f.o.b. Gary	5.35
Standard cokes, f.o.b. cars dock Pacific ports	5.90

Terne Plate	
(F.o.b. Pittsburgh)	
(Per Package, 20 x 28 in.)	
8-lb. coating I.C.	\$10.00
15-lb. coating I.C.	12.00
20-lb. coating I.C.	13.00
25-lb. coating I.C.	14.00
30-lb. coating I.C.	15.25
40-lb. coating I.C.	17.50

Hot-Rolled Hoops, Bands, Strips and Flats under 1/4 in.	
Base per Lb.	
All widths up to 24 in., P'gh.	1.85c.
All widths up to 24 in., Chicago	1.95c.
All widths up to 24 in., del'd Detroit	2.05c.
All widths up to 24 in., Birmingham	2.00c.
Cooperage stock, Pittsburgh	2.10c.
Cooperage stock, Chicago	2.20c.

Cold-Rolled Strips	
Base per Lb.	
F.o.b. Pittsburgh	2.60c.
F.o.b. Cleveland	2.60c.
Del'd Chicago	2.88c.
F.o.b. Worcester	2.80c.

Fender Stock	
No. 14, Pittsburgh or Cleveland	2.90c.
No. 14, Worcester	3.30c.
No. 20, Pittsburgh or Cleveland	3.30c.
No. 20, Worcester	3.70c.

Hot-Rolled Rail Steel Strips	
Base per Lb.	
F.o.b. Pittsburgh	1.70c.
F.o.b. Chicago	1.75c.
F.o.b. Birmingham	1.85c.

## WIRE PRODUCTS

(Carload lots, f.o.b. Pittsburgh and Cleveland.)

To Manufacturing Trade	Per Lb.
Bright wire	2.30c.
Spring wire	2.90c.

Chicago prices on products sold to the manufacturing trade are \$1 a ton above Pittsburgh or Cleveland, Worcester and Duluth prices are \$2 a ton above, Birmingham \$3 above, and Pacific Coast prices \$9 a ton above Pittsburgh or Cleveland.

Qualified jobbers are entitled to a reduction of 20c. a 100 lb. from the base price on carload shipments to stock, and of 10c. a 100 lb. on less-carload shipments to stock.

Base per Keg	
Standard wire nails	2.60
Smooth coated nails	2.60
15 gage and coarser	4.60
19 gage and finer	5.10

Base per 100 Lb.	
Annealed fence wire	\$2.45
Galvanized fence wire	2.80
Polished staples	3.30
Galvanized staples	3.55
Barbed wire, galvanized	3.00
Woven wire fence, base column	63.00

Chicago and Anderson, Ind., mill prices are \$1 a ton over Pittsburgh base (on all products except woven wire fence, for which the Chicago price is \$2 above Pittsburgh); Duluth, Minn., and Worcester, Mass., mill prices are \$2 a ton over Pittsburgh (except for woven wire fence at Duluth which is \$3 over Pittsburgh), and Birmingham mill prices are \$3 a ton over Pittsburgh.

On wire nails, barbed wire, staples and fence wire, prices at Houston, Galveston and Corpus Christi, Tex., New Orleans, Lake Charles, La., and Mobile, Ala., are \$6 a ton over Pittsburgh, while Pacific Coast prices are \$8 over Pittsburgh. Reception: on fence wire Pacific Coast prices are \$11 a ton above Pittsburgh. On staples and barbed wire, prices of \$6 a ton above Pittsburgh are also quoted at Beaumont and Orange, Tex.

## Wire Hoops, Twisted or Welded

OT List	
F.o.b. Pittsburgh	35 and 2 1/2 off
F.o.b. Chicago	35 off

## STEEL AND WROUGHT PIPE

### AND TUBING

#### Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills  
F.o.b. Pittsburgh only on wrought iron pipe.

Butt Weld			
Steel		Wrought Iron	
Inches	Black Galv.	Inches	Black Galv.
1/4	51 1/2	1/4	91 1/2 + 138
1/2	53 1/2	1/2	91 1/2 + 138
3/4	56 1/2	3/4	91 1/2 + 138
1	62	1	91 1/2 + 138
1 to 3	64	1 1/2	39 1/2
		2	43 1/2
			26
Lap Weld			
2	60	2	38 1/2
2 1/2	63	2 1/2	38 1/2
3 1/2	65	3 1/2	38 1/2
4	64	4	38 1/2
9 and 10	63 1/2	9 to 12	38 1/2
11 and 12	62 1/2		



# BOLTS, NUTS, RIVETS AND SET SCREWS

**Bolts and Nuts**  
(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Machine bolts	Per Cent Off List
.....70, 10 and 5	
Carriage bolts	.....70, 10 and 5
Lag bolts	.....70, 10 and 5
Pipe bolts, Nos. 1, 2, 3 and 7	
Hot-pressed nuts, blank or tapped	.....70, 10 and 5
Hot-pressed nuts, blank or tapped	.....70, 10 and 5
Hexagons	.....70, 10 and 5
C.p.t. and t. square or hex. nuts	.....70, 10 and 5
Semi-finished hexagon nuts, U.S.S.	.....70, 10 and 5
Semi-finished hexagon nuts, S.A.E.	.....70, 10 and 5
1/4 in. to 7/16 in. diameter	.....70, 10 and 5
1/2 in. to 1 in. diameter	.....70, 10 and 5
Larger than 1 in. diameter	.....70, 10 and 5
Store bolts in packages, Pittsburgh	.....75
Store bolts in packages, Chicago	.....75
Store bolts in packages, Cleveland	.....75
Store bolts in bulk, P'gh.	.....83
Store bolts in bulk, Chicago	.....83
Store bolts in bulk, Cleveland	.....83
Tire bolts	.....60 and 5

**Large Rivets**  
(1/2-in. and larger)

F.o.b. Pittsburgh or Cleveland	.....\$2.90
F.o.b. Chicago	.....3.00
F.o.b. Birmingham	.....3.05

**Small Rivets**  
(7/16-in. and smaller)

F.o.b. Pittsburgh	.....70 and 5
F.o.b. Cleveland	.....70 and 5
F.o.b. Chicago and Birm'g'm.	.....70 and 5

**Cap and Set Screws**  
(Freight allowed up to but not exceeding 60c. per 100 lb. on lots of 200 lb. or more)

Milled cap screws, 1 in. dia.	Per Cent Off List
.....80, 10 and 10	
Milled standard set screws, case hardened, 1 in. dia. and smaller	.....75
Milled headless set screws, cut thread	.....75
1/4 in. and smaller	.....75
Upset hex. head cap screws, U.S.S.	.....75
or S.A.E. thread, 1 in. dia. and smaller	.....85
Upset set screws, cut and oval point	.....75 and 10 to 80
Milled studs	.....65 to 65 and 10

**Alloy and Stainless Steel**

**Alloy Steel Ingots**  
F.o.b. Pittsburgh, Chicago, Canton, Massillon, Buffalo, Bethlehem

Uncropped .....\$40 per gross ton

**Alloy Steel Blooms, Billets and Slabs**  
F.o.b. Pittsburgh, Chicago, Canton, Massillon, Buffalo, Bethlehem

Base price, \$49 a gross ton.

**Alloy Steel Bars**  
Price del'd Detroit is \$52.

F.o.b. Pittsburgh, Chicago, Buffalo, Bethlehem, Massillon or Canton.

Open-hearth grade, base .....2.45c.

Delivered price at Detroit is .....2.60c.

S.A.E.

Series Numbers

Differential per 100 lb.

2500 (1/2% Nickel) .....\$0.25

2100 (3/4% Nickel) .....0.55

2300 (5% Nickel) .....1.50

2500 (5% Nickel) .....2.25

3100 Nickel Chromium .....0.55

3200 Nickel Chromium .....1.35

3300 Nickel Chromium .....3.80

3400 Nickel Chromium .....3.20

4100 Chromium Molybdenum (0.15 to 0.25 Molybdenum) .....0.50

4100 Chromium Molybdenum (0.25 to 0.40 Molybdenum) .....0.70

4600 Nickel Molybdenum (0.20 to 0.30 Molybdenum) (1.50 to 2.00 Nickel) .....1.05

5100 Chromium Steel (0.60 to 0.90 Chromium) .....0.35

5100 Chromium Steel (0.80 to 1.10 Chromium) .....0.45

5100 Chromium Spring Steel .....base

6100 Chromium Vanadium Bar .....1.20

6100 Chromium Vanadium Spring Steel .....0.70

Chromium Nickel Vanadium .....1.50

Carbon Vanadium .....0.95

These prices are for hot-rolled steel bars. The differential for most grades in electric furnace steel is 50c. higher. The differential for cold-drawn bars is 1/4c. per lb. higher with separate extras. Blooms, billets and slabs under 4x4 in. or equivalent are sold on the bar base. Slabs with a section area of 16 in. and 2 1/4 in. thick or over take the billet base. Sections 4x4 in. to 10x10 in. or equivalent carry a gross ton price, which is the net price for bars for the same analysis. Larger sizes carry extras.

**Alloy Cold-Finished Bars**  
F.o.b. Pittsburgh, Chicago, Gary, Cleveland or Buffalo. 2.95c. base per lb.

**STAINLESS STEEL No. 302**  
(17 to 19% Cr. 7 to 9% Ni. 0.08 to 0.20% C.)

(Base Prices, f.o.b. Pittsburgh)

Forging billets .....Per Lb. 19.55c.

Rolling slabs .....15c.

Bars .....23c.

Plates .....23c.

Structural shapes .....23c.

Sheets .....23c.

Hot-rolled strip .....20 1/2c.

Cold-rolled strip .....27c.

Drawn wire .....23c.

# Raw and Semi-Finished Steel

## Carbon Steel Rolling Ingots

F.o.b. Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham. Uncropped .....\$29 per gross ton

## Carbon Steel Forging Ingots

F.o.b. Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Birmingham. Uncropped .....\$31 per gross ton

## Billets, Blooms and Slabs

F.o.b. Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham. Per Gross Ton

Rolling .....\$27.00

Forging quality .....32.00

Delivered Detroit

Rolling .....\$30.00

Forging .....35.00

Billets Only F.o.b. Duluth

Rolling .....\$29.00

Forging .....34.00

## Sheet Bars

F.o.b. Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point, Md.

Per Gross Ton

Open-hearth or Bessemer .....\$28.00

## Skelp

F.o.b. Pittsburgh, Chicago, Youngstown, Buffalo, Coatesville, Pa., Sparrows Point, Md.

Per Lb.

Grooved .....1.70c.

Universal .....1.70c.

Sheared .....1.70c.

## Tube Rounds

Base per Lb.

F.o.b. Pittsburgh .....1.80c.

F.o.b. Chicago .....1.85c.

F.o.b. Cleveland .....1.85c.

F.o.b. Buffalo .....1.90c.

F.o.b. Birmingham .....1.95c.

## Wire Rods

(Common, base)

Per Gross Ton

F.o.b. Pittsburgh .....\$38.00

F.o.b. Cleveland .....38.00

F.o.b. Chicago .....39.00

F.o.b. Anderson, Ind. ....39.00

F.o.b. Youngstown .....39.00

F.o.b. Worcester, Mass. ....40.00

F.o.b. Birmingham .....41.00

F.o.b. San Francisco .....47.00

F.o.b. Galveston .....44.00

# Pig Iron and Ferroalloys

## PIG IRON

## PRICES PER GROSS TON AT BASING POINTS

Basing Points	No. 2 Fdry.	Malleable	Basic	Bessemer
Everett, Mass.	\$19.50	\$20.00	\$19.00	\$20.50
Bethlehem, Pa.	19.50	20.00	19.00	20.50
Birdsboro, Pa.	19.50	20.00	19.00	20.50
Swedeland, Pa.	19.50	20.00	19.00	20.50
Steelton, Pa.	19.50	20.00	19.00	20.50
Sparrows Point, Md.	19.50	20.00	19.00	20.50
Neville Island, Pa.	18.50	18.50	18.00	19.00
Sharpsville, Pa.	18.50	18.50	18.00	19.00
Youngstown	18.50	18.50	18.00	19.00
Buffalo	18.50	18.50	17.50	19.50
Erie, Pa.	18.50	18.50	18.00	19.00
Cleveland	18.50	18.50	18.00	19.00
Toledo, Ohio	18.50	18.50	18.00	19.00
Jackson, Ohio	20.25	20.25	19.75	20.50
Detroit	18.50	18.50	18.00	19.00
Hamilton, Ohio	18.50	18.50	18.00	19.00
Chicago	18.50	18.50	18.00	19.00
Granite City, Ill.	18.50	18.50	18.00	19.00
Duluth, Minn.	19.00	19.00	18.50	19.50
Birmingham	14.50	14.50	13.50	19.00
Provo, Utah	17.50	17.50	17.00	18.00

## DELIVERED PRICES PER GROSS TON AT CONSUMING CENTERS

	No. 2 Fdry.	Malleable	Basic	Bessemer
Boston Switching District				
From Everett, Mass.	\$20.00	\$20.50	\$19.50	\$21.00
Brooklyn				
From East, Pa. or Buffalo	21.77	22.27	21.27	22.77
Newark or Jersey City, N. J.	20.89	21.39	20.39	21.89
From East, Pa. or Buffalo				
Philadelphia	20.26	20.76	19.76	21.26
From Eastern Pa.				
Cincinnati	19.51	19.51	19.01	20.01
From Hamilton, Ohio				
Canton, Ohio	19.76	19.76	19.26	20.26
From Cleveland and Youngstown				
Columbus, Ohio	20.50	20.50	20.00	21.00
From Hamilton, Ohio				
Mansfield, Ohio	20.26	20.26	19.76	20.76
From Cleveland and Toledo				
Indianapolis	20.77	20.77	20.27	21.27
From Hamilton, Ohio				
South Bend, Ind.	20.55	20.55	20.05	21.05
From Chicago				
Milwaukee	19.50	19.50	19.00	20.00
From Chicago				
St. Paul	20.94	20.94	20.44	21.44
From Duluth				
Davenport, Iowa	20.26	20.26	19.76	20.76
From Chicago				
Kansas City	21.04	21.04	20.54	21.54
From Granite City				

Delivered prices on Southern iron for shipment to Northern points are 38c. a gross ton below delivered prices from the nearest Northern basing points.

## LOW PHOSPHORUS PIG IRON

Basing points: Birdsboro, Pa., Steelton, Pa., and Standish, N. Y. ....\$23.50

## GRAY FORCE PIG IRON

Valley furnace .....\$18.00

Pittsburgh district furnace .....18.00

## CHARCOAL PIG IRON

Lake Superior furnace .....\$21.00

Delivered Chicago .....24.04

Delivered Buffalo .....24.28

## CANADA

## Pig Iron

Per gross ton: Delivered Toronto

No. 1 fdy., sil. 2.25 to 2.75 .....\$21.00

No. 2 fdy., sil. 1.75 to 2.75 .....20.50

Malleable .....31.00

## Delivered Montreal

No. 1 fdy., sil. 2.25 to 2.75 .....\$22.50

No. 2 fdy., sil. 1.75 to 2.25 .....22.00

Malleable .....22.50

Basic .....22.00

## FERROALLOYS

### Ferromanganese

F.o.b. New York, Philadelphia, Baltimore, Mobile or New Orleans.

Per Gross Ton

Domestic, 80% (carload) .....\$55.00

### Spiegeleisen

Per Gross Ton Furnace

Domestic, 19 to 21% .....\$26.00

### Electric Ferrosilicon

Per Gross Ton Delivered

50% (carloads) .....\$77.50

50% (ton lots) .....85.00

75% (carloads) .....126.00

75% (ton lots) .....136.00

### Silvery Iron

F.o.b. Jackson, Ohio, Furnace

Per Gross Ton

6% .....\$22.75

7% .....23.75

8% .....24.75

9% .....25.75

10% .....26.75

11% .....27.75

The lower all-rail delivered price from Jackson or Buffalo is quoted with freight allowed. Base prices at Buffalo are \$1.25 a ton higher than at Jackson.

### Bessemer Ferrosilicon

F.o.b. Jackson, Ohio, Furnace

Per Gross Ton

10% .....\$27.75

11% .....28.75

12% .....30.25

13% .....31.75

Manganese 1 1/2 to 3%, \$1 a ton additional. For each unit of manganese over 3%, \$1 a ton additional. Phosphorus 0.75% or over, \$1 ton additional.

Base prices at Buffalo are \$1.25 a ton higher than at Jackson.

### Other Ferroalloys

Ferrotungsten, per lb. contained W, del., carloads .....\$1.35 to \$1.45

Ferrotungsten, less carloads, 1.45 to 1.55

Ferrocromium, 4 to 6% carbon and up, 65 to 70% Cr. per lb. contained Cr. delivered, in carloads .....10.00c.

Ferrocromium, 2% carbon .....16.50c. to 17.00c.

Ferrocromium, 1% carbon .....17.50c. to 18.00c.

Ferrocromium, 0.10% carbon .....19.50c. to 20.00c.

Ferrocromium, 0.06% carbon .....20.00c. to 20.50c.

Ferrovandium, del., per lb. contained V .....\$2.70 to \$2.90

Ferrocobaltititanium, 15 to 18% Ti, 6 to 8% C, f.o.b. furnace carload and contract per net ton .....\$137.50

Ferrophosphorus, electric, or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per gross ton with \$2 unitage .....50.00

Ferrophosphorus, electric, 24% f.o.b. Anniston, Ala., per gross ton with \$2.75 unitage .....65.00

Ferromolybdenum, per lb. Mo., del. 95c.

Calcium molybdate, per lb. Mo., del. ....80c.

Silico spiegel, per ton, f.o.b. furnace, car lots .....\$38.00

Ton lots or less per ton .....45.50

Silico-manganese, gross ton, delivered: 2.50% carbon grade .....95.00



# Iron and Steel Scrap

## PITTSBURGH

Per gross ton delivered consumers' yards:	
No. 1 heavy melting steel	\$12.00 to \$12.50
No. 2 heavy melting steel	11.00 to 11.50
No. 2 railroad wrought	12.00 to 12.50
Scrap rails	13.00 to 13.50
Rails, 3 ft. and under	14.00 to 14.50
Compressed sheet steel	12.00 to 12.50
Hand bundled sheet steel	11.00 to 11.50
Hvy. steel axle turnings	10.50 to 11.00
Machine shop turnings	7.50 to 8.00
Short shov. turnings	7.50 to 8.00
Short mixed borings and turnings	6.75 to 7.25
Cast iron borings	6.75 to 7.25
Cast iron car wheels	12.00 to 12.75
Heavy breakable cast	11.50 to 12.00
No. 1 cast	12.50 to 13.00
Railr. knuckles and couplers	14.00 to 14.50
Rail. coil and leaf springs	14.00 to 14.50
Roller steel wheels	14.00 to 14.50
Low phos. billet crops	14.50 to 15.00
Low phos. sheet bar crops	14.50 to 15.00
Low phos. plate scrap	14.00 to 14.50
Steel car axles	14.50 to 15.00

## CHICAGO

Delivered Chicago district consumers:	
Per Gross Ton	
Heavy melting steel	\$10.50 to \$11.00
Automotive hvy. melt. steel	10.00 to 10.50
Shoveling steel	10.50 to 11.00
Hydraulic comp. sheets	9.50 to 10.00
Drop forge flashings	9.25 to 9.75
No. 1 busheling	9.00 to 9.50
Roller car wheels	11.50 to 12.00
Railroad ties	12.00 to 12.50
Railroad leaf springs	11.50 to 12.00
Steel couplers and knuckles	11.50 to 12.00
Coil springs	12.00 to 12.50
Coil turnings (elec. fur.)	10.50 to 11.00
Low phos. punchings	12.00 to 12.50
Low phos. plates, 12 in. and under	13.00 to 13.50
Cast iron borings	6.25 to 6.75
Short shoveling turnings	7.75 to 8.25
Machine shop turnings	5.50 to 6.00
Revolving rails	12.00 to 12.50
Steel rails, less than 3 ft.	12.50 to 13.00
Steel rails, less than 2 ft.	13.00 to 13.50
Angle bars, steel	11.50 to 12.00
Cast iron car wheels	11.00 to 11.50
Railroad malleable	13.00 to 13.50
Agricultural malleable	9.50 to 10.00

Per Net Ton	
Iron car axles	\$13.50 to \$14.00
Steel car axles	13.75 to 14.25
No. 1 railroad wrought	8.50 to 9.00
No. 2 railroad wrought	8.25 to 8.75
No. 2 busheling	5.00 to 5.50
Locomotive tires, smooth	10.00 to 10.50
Pipe and flues	5.00 to 5.50
No. 1 machinery cast	9.50 to 10.00
Clean automobile cast	9.00 to 9.50
No. 1 railroad cast	8.50 to 9.00
No. 1 agricultural cast	8.50 to 9.00
Stove plate	6.00 to 6.50
Grate bars	6.00 to 6.50
Truck shoes	6.50 to 7.00

## PHILADELPHIA

Per gross ton delivered consumers' yards:	
No. 1 heavy melting steel	\$10.00 to \$11.00
No. 2 heavy melting steel	8.50 to 9.50
No. 1 railroad wrought	10.75 to 11.25
Bundled sheets	9.50 to 10.00
Hydraulic compressed, new	10.50 to 11.00
Hydraulic compressed, old	7.50 to 8.00
Machine shop turnings	6.00 to 6.50
Heavy axle turnings	8.50 to 9.00
Cast borings	5.00 to 5.50
Stove plate (steel works)	8.25 to 8.75
Heavy breakable cast	10.50 to 11.00
No. 1 low phos. heavy	15.00 to 15.50
Couplers and knuckles	14.00 to 14.50
Roller steel wheels	11.00 to 11.50
No. 1 blast furnace	5.00 to 5.50
Spec. iron and steel pipe	8.00 to 8.50
Shafting	17.00 to 17.50
Steel axles	16.50 to 17.00
No. 1 forge fire	9.50 to 10.00
Cast iron car wheels	12.25 to 12.75
No. 1 cast	11.00
Cast borings (chem.)	12.00 to 14.00
Steel rails for rolling	12.00 to 12.50

## CINCINNATI

Dealers' buying prices per gross ton:	
No. 1 heavy melting steel	\$8.00 to \$8.50
No. 2 heavy melting steel	6.50 to 7.00
Scrap rails for melting	8.00 to 8.50
Loose sheet clippings	4.50 to 5.00
Bundled sheets	6.00 to 6.50
Cast iron borings	4.50 to 5.00
Machine shop turnings	4.50 to 5.00
No. 1 busheling	2.75 to 3.25
No. 2 busheling	2.00 to 2.50
Rails for rolling	9.00 to 9.50
No. 1 locomotive tires	7.25 to 7.75
Short rails	11.50 to 12.00
Cast iron car wheels	8.00 to 8.50
No. 1 machinery cast	9.25 to 9.75
No. 1 railroad cast	8.50 to 9.00
Burnt cast	6.00 to 6.50
Stove plate	6.00 to 6.50
Agricultural malleable	8.00 to 8.50
Railroad malleable	9.00 to 9.50

## CLEVELAND

Per gross ton delivered consumers' yards:	
No. 1 heavy melting steel	\$10.50 to \$11.00
No. 2 heavy melting steel	10.00 to 10.50
Compressed sheet steel	9.50 to 10.00
Light bundled sheet stampings	7.50 to 8.00
Drop forge flashings	9.50 to 10.00
Machine shop turnings	7.25 to 7.75
Short shoveling turnings	7.50 to 8.00
No. 1 busheling	9.50 to 10.00
Steel axle turnings	9.50 to 10.00
Low phos. billet crops	14.50 to 15.00
Cast iron borings	7.50 to 8.00
Mixed borings and short turnings	7.50 to 8.00
No. 2 busheling	7.50 to 8.00
No. 1 cast	12.00 to 12.50
Railroad grate bars	7.00 to 7.50
Rails under 3 ft.	14.50 to 15.00
Rails for rolling	15.50 to 16.00
Railroad malleable	13.00 to 13.50
Cast iron car wheels	12.00

## BUFFALO

Per gross ton, f.o.b. Buffalo consumers' plants:	
No. 1 heavy melting steel	\$11.00
No. 2 heavy melting scrap	\$9.50 to 10.00
Scrap rails	12.00 to 12.50
New hydraulic comp. sheets	9.50 to 10.00
Old hydraulic comp. sheets	8.50 to 9.00
No. 1 busheling	9.50 to 10.00
Hvy. steel axle turnings	8.00 to 8.50
Machine shop turnings	5.50 to 6.00
Knuckles and couplers	12.00 to 12.50
Coil and leaf springs	12.00 to 12.50
Roller steel wheels	12.00 to 12.50
Low phos. billet crops	13.75 to 14.25
Short shov. steel turnings	6.50 to 7.00
Short mixed borings and turnings	6.50 to 7.00
Cast iron borings	6.50 to 7.00
No. 2 busheling	6.50 to 7.00
Steel car axles	13.50 to 14.00
Iron axles	13.50 to 14.00
No. 1 machinery cast	11.00 to 11.50
No. 1 cupola cast	10.00 to 10.50
Stove plate	9.50 to 10.00
Steel rails, 3 ft. and under	14.00 to 14.50
Cast iron car wheels	11.00 to 11.50
Industrial malleable	12.50 to 13.00
Railroad malleable	12.50 to 13.00
Chemical borings	8.50 to 9.00

## BOSTON

Dealers' buying prices per gross ton:	
*No. 1 heavy melting steel	\$9.00 to \$9.25
No. 1 heavy melting steel	6.50 to 6.75
Scrap T rails	7.00 to 7.50
*No. 2 steel	8.25 to 8.50
No. 2 steel	5.50 to 6.00
Breakable cast	5.75 to 6.00
Machine shop turnings	6.00 to 6.50
Bundled skeleton, long	5.25 to 5.50
Forge flashings	5.25 to 5.50
Mixed borings and turnings	1.00 to 1.50
Shafting	12.00 to 12.50
Steel car axles	11.50 to 12.00
Cast iron borings, chemical	6.50 to 7.00
Stove plate	4.00 to 4.25

Per gross ton delivered consumers' yards:	
Textile cast	\$9.00 to \$9.50
No. 1 machinery cast	9.00 to 9.50
Stove plate	6.00 to 6.50
Railroad malleable	11.00 to 11.50

\* Delivered local army base.

## NEW YORK

Dealers' buying prices per gross ton:	
No. 1 heavy melting steel	*\$8.00 to \$9.00
No. 2 heavy melting steel	7.00 to 7.50
Heavy breakable cast	6.00 to 6.25
No. 1 machinery cast	7.50 to 8.00
No. 2 cast	6.50 to 7.00
Stove plate	6.00 to 6.50
Steel car axles	13.50 to 14.00
No. 1 railroad wrought	7.00 to 7.50
No. 1 yard wrought, long	6.00 to 6.50
Spec. iron and steel pipe	4.50 to 5.00
Forge fire	5.50 to 6.00
Rails for rolling	9.00 to 9.50
Short shoveling turnings	2.50 to 3.00
Machine shop turnings	2.50 to 3.00
Cast borings	3.50 to 3.75
No. 1 blast furnace	2.00 to 2.50
Cast borings (chemical)	11.00 to 11.50
Unprepared yard iron and steel	4.50 to 5.00

Per gross ton, delivered local foundries:	
No. 1 machinery cast	\$10.50
No. 1 hvy. cast (cupola)	9.50
No. 2 cast	8.00

\*For direct car loading only.  
†Loading on barge.

## BIRMINGHAM

Per gross ton delivered consumers' yards:	
Heavy melting steel	\$9.00 to \$9.50
Scrap steel rails	10.00 to 10.50
Short shoveling turnings	7.00
Stove plates	7.00
Steel axles	11.50
Iron axles	11.50
No. 1 railroad wrought	7.00
Rails for rolling	12.50
No. 1 cast	9.50 to 10.00
Tramcar wheels	10.00
Cast iron borings, chem.	8.00

## ST. LOUIS

Per gross ton delivered consumers' yards:	
Selected heavy steel	\$8.75 to \$9.25
No. 1 heavy melting	8.25 to 8.75
No. 2 heavy melting	7.25 to 7.75
No. 1 locomotive tires	9.75 to 10.25
Misc. stand-sec. rails	10.00 to 10.50
Railroad springs	11.00 to 11.50
Bundled sheets	6.00 to 6.50
No. 2 railroad wrought	8.25 to 8.75
No. 1 busheling	5.00 to 5.50
Cast iron borings and shoveling turnings	4.00 to 4.50
Rails for rolling	10.50 to 11.00
Machine shop turnings	4.00 to 4.50
Heavy turnings	5.50 to 6.00
Steel car axles	13.50 to 14.00
Iron car axles	15.00 to 16.00
No. 1 railroad wrought	7.50 to 8.00
Steel rails less than 3 ft.	11.75 to 12.25
Steel angle bars	9.50 to 10.00
Cast iron car wheels	7.50 to 8.00
No. 1 machinery cast	9.00 to 9.50
Railroad malleable	10.00 to 10.50
Mesabi, non-Bessemer, 51.50% iron	8.50 to 9.00
Stove plate	6.50 to 7.00
Agricul. malleable	8.50 to 9.00

## DETROIT

Dealers' buying prices per gross ton:	
Heavy melting steel	\$7.50 to \$8.00
Borings and short turnings	4.25 to 4.75

## ORES, FLUORSPAR, COKE, FUEL, REFRACTORIES

### Lake Superior Ores

Delivered Lower Lake Ports

Per Gross Ton	
Old range, Bessemer, 51.50% iron	\$4.80
Old range, non-Bessemer, 51.50% iron	4.65
Mesabi, Bessemer, 51.50% iron	4.65
Mesabi, non-Bessemer, 51.50% iron	4.50
High phosphorus, 51.50% iron	4.40

### Foreign Ore

C.A.F. Philadelphia or Baltimore

Per Unit	
Iron, low phos., copper free, 55 to 58% iron, dry Spanish or Algeria	9.50c.
Iron, low phos., Swedish, average 68 1/2% iron	9.50c.
Iron, basic or foundry, Swedish, aver. 65% iron	9c.
Iron, basic or foundry, Russian, aver. 65% iron	9c.
Manganese, Caucasian, washed 52% manganese, African, Indian, 44-48%	21c.
Manganese, African, Indian, 49-51%	24c.
Manganese, Brazilian, 46 to 48 1/2%	20c.

Per Net Ton Unit	
Tungsten, Chinese, wolframite, duty paid, delivered*	\$17.50 to \$18.50
Tungsten, domestic scheelite, delivered†	17.00

Per Gross Ton	
Chrome, 45%, Cr <sub>2</sub> O <sub>3</sub> , crude, c.i.f. Atlantic Seaboard	\$17.00
Chrome, 48%, Cr <sub>2</sub> O <sub>3</sub> , c.i.f. Atlantic Seaboard	20.00

\*Quotations nominal in absence of sales.  
†Nominal; no supplies available.

### Fluorspar

Per Net Ton	
Domestic, washed gravel, 85-5, f.o.b. Kentucky and Illinois mines for all-rail shipment	\$13.00
Same grade for Ohio River barge shipment for Kentucky and Illinois River landings	16.00
No. 2 lump, 85-5, f.o.b. Kentucky and Illinois mines	14.00
Foreign, 85% calcium fluoride, not over 5% silicon, c.i.f. Atlantic ports, duty paid	19.00
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2 1/2% silicon, f.o.b. Illinois and Kentucky mines	30.00

### COKE, COAL AND FUEL OIL

Coke	
Per Net Ton	
Furnace, f.o.b. Connellsville	\$3.85
Prompt	
Foundry, f.o.b. Connellsville	\$4.60 to \$5.10
Prompt	
Foundry, by-product, Chicago ovens, for delivery outside switching district	8.50
Foundry, by-product, delivered in Chicago switching district	9.25
Foundry, by-product, New England, delivered	11.00
Foundry, by-product, Newark or Jersey City, del'd.	\$2.20 to \$2.81
Foundry, by-product, Phila.	9.00

Long turnings	\$3.50 to \$4.00
No. 1 machinery cast	10.25 to 10.75
Automotive cast	10.75 to 11.25
Hydraulic comp. sheets	7.50 to 8.00
Stove plate	6.50 to 7.00
New factory busheling	6.50 to 7.00
Old No. 2 busheling	4.25 to 4.75
Sheet clippings	5.50 to 6.00
Flashings	7.25 to 7.75
Low phos. plate scrap	8.25 to 8.75

## CANADA

Dealers' buying prices per gross ton:	
Toronto Market	
Heavy melting steel	\$7.00
Rails scrap	8.00
Machine shop turnings	3.00
Boiler plate	4.50
Heavy axle turnings	4.50
Cast borings	4.00
Steel borings	2.00
Wrought pipe	3.50
Steel axles	7.00
Axles, wrought iron	7.00
No. 1 machinery cast	9.00
Stove plate	5.50
Standard car wheels	7.25
Malleable	6.75

Foundry, by-product, Cleveland, delivered	
Foundry, Birmingham	\$9.00
Foundry, by-product, St. Louis, f.o.b. ovens	8.00
Foundry, by-product, del'd St. Louis	8.00

Coal	
Per Net Ton	
Mine run steam coal, f.o.b. W. Pa. mines	\$1.80 to \$2.10
Mine run coking coal, f.o.b. W. Pa. mines	2.05 to 2.30
Mine run gas coal, f.o.b. Pa. mines	2.25 to 2.50
Steam slack, f.o.b. W. Pa. mines	2.05 to 2.30
Gas slack, f.o.b. W. Pa. mines	1.55 to 1.80
Gas slack, f.o.b. W. Pa. mines	1.90 to 2.10

Fuel Oil	
Per Gal. f.o.b. Bayonne, N. J.	
No. 3 distillate	4.00
No. 4 industrial	3.50

Per Gal. f.o.b. Baltimore	
No. 3 distillate	4.00
No. 4 industrial	3.50

Per Gal. del'd Chicago	
No. 3 industrial fuel oil	3.80
No. 5 industrial fuel oil	3.50

Per Gal. f.o.b. Cleveland	
No. 3 distillate	3.80
No. 4 industrial	3.50
No. 5 industrial	3.20

## REFRACTORIES

Fire Clay Brick	
Per 1000 f.o.b. Works	
High-heat Intermediate Duty Brick	
Pennsylvania	\$45.00
Maryland	40.00
New Jersey	55.00
Ohio	45.00
Kentucky	45.00
Missouri	45.00
Illinois	45.00
Ground fire clay, per ton	7.00

Chrome Brick	
Per Net Ton	
Standard size	\$45.00

Chemically Bonded Chrome Brick	
Per Net Ton	
Standard size, f.o.b. Baltimore, Plymouth Meeting and Chester	\$45.00

Silica Brick	
Per 1000 f.o.b. Works	
Pennsylvania	\$45.00
Chicago	50.00
Birmingham	55.00
Silica clay, per ton	8.00

Magnesite Brick	
	Per Net Ton
Standard size, burned, f.o.b. Baltimore and Chester, Pa. ....	\$65.00
Unburned, f.o.b. Baltimore .....	55.00
Imported grain magnesite, f.o.b. Baltimore and Chester, Pa. ....	55.00
Domestic grain magnesite, f.o.b. Baltimore and Chester, Pa. ....	55.00
Domestic, f.o.b. Chewelah, Wash. ....	22.00

# Warehouse Prices for Steel Products

## PITTSBURGH

	Base per Lb.
Plates	3.15c
Structural shapes	3.15c
Soft steel bars and small shapes	2.90c
Reinforcing steel bars	2.90c
Cold-finished and screw stock:	
Rounds and hexagons	*3.45c
Squares and flats	*3.45c
Hoops and bands under 1/4 in.	3.20c
Hot-rolled annealed sheets (No. 24), 25 or more bundles	3.30c
Galv. sheets (No. 24)	3.95c
Hot-rolled sheets (No. 10)	2.95c
Galv. corrug. sheets (No. 28), per square (more than 3750 lb.)	\$3.69
Spikes, large, all sizes, per 100 count	2.90c
Track bolts, all sizes, per 100 count	3.50c
Machine bolts, 100 counts, 65 per cent off list	
Carriage bolts, 100 count, 65 per cent off list	
Nuts, all styles, 100 count, 65 per cent off list	
Large rivets, base per 100 lb.	\$3.50
Wire, black, soft ann'l'd, base per 100 lb.	*2.70
Wire, galv. soft, base per 100 lb.	*2.95c
Common wire nails, per keg	*2.834
Cement coated nails, per keg	*2.834

On plates, structurals, bars, reinforcing bars, bands, hoops and blue annealed sheets, base applies to orders of 400 to 9999 lb.  
\*Delivered in Pittsburgh switching district.

## CHICAGO

	Base per Lb.
Plates and structural shapes	3.20c
Soft steel bars	2.95c
Cold-fn. steel bars:	
Rounds and hexagons	3.50c
Flats and squares	3.50c
Hot-rolled strip	3.30c
Hot-rolled annealed sheets (No. 24)	3.85c
Galv. sheets (No. 24)	4.55c
Hot-rolled sheets (No. 10)	3.05c
Spikes (keg lots)	3.50c
Track bolts (keg lots)	4.65c
Rivets, structural (keg lots)	3.65c
Rivets, boiler (keg lots)	3.75c
Machine bolts	Per Cent Off List
Carriage bolts	60 and 5
Lag screws	60 and 5
Hot-pressed nuts, sq. tap, or blank	60 and 5
Hot-pressed nuts, hex. tap or blank	60 and 5
Hex. head cap screws	80
Cut point set screws	70 and 10
Flat head bright wood screws	37 1/2 and 10
Spring cotter pins	50
Store bolts in full packages	70
Rd. hd. tank rivets, 7/16 in. and smaller	57 1/2
Wrought washers	\$4.50 off list
No. 8 black ann'l'd wire per 100 lb.	\$3.85
Com. wire nails, base per keg	3.05
Cement c'd nails, base per keg	3.05

On plates, shapes, bars, hot-rolled strip and heavy hot-rolled sheets, the base applies on orders of 400 to 9999 lb. All prices are f.o.b. consumers' plants within the Chicago switching district.

## NEW YORK

	Base per Lb.
Plates, 1/4 in. and heavier	3.40c
Structural shapes	3.37c

Soft steel bars, small shapes	3.22c
Iron bars, swed. charcoal	3.22c
Cold-fn. shafting and screw stock:	
Rounds and hexagons	3.92c
Flats and squares	4.42c
Cold-rolled; strip, soft and quarter hard	3.32c
Hoops	3.52c
Bands	3.52c
Hot-rolled sheets (No. 10)	3.27c
Hot-rolled ann'l'd sheets (No. 24)	3.85c
Galvanized sheets (No. 24)	4.50c
Long term sheets (No. 24)	5.20c
Standard tool steel	1.00c
Wire, black annealed (No. 10)	3.25c
Wire, galv. (No. 10)	3.85c
Tire steel, 1 x 1/4 in. and larger	3.65c
Open hearth spring steel	4.00c to 10.00c
Common wire nails, base, per keg	\$3.21

	Off List
Machine bolts, cut thread:	
All diameters	70
Carriage bolts, cut thread:	
All diameters	70
Boiler tubes:	Per 100 Ft.
Lap welded, 2-in.	\$18.95
Seamless welded, 2-in.	19.24
Charcoal iron, 2-in.	24.94
Charcoal iron, 4-in.	63.65

\*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

## ST. LOUIS

	Base per Lb.
Plates and struc. shapes	3.44c
Bars, soft steel or iron	3.19c
Cold-fn. rounds, shafting, screw stocks	3.74c
Hot-rolled annealed sheets (No. 24)	4.09c
Galv. sheets (No. 24)	4.64c
Hot-rolled sheets (No. 10)	3.29c
Black corrug. sheets (No. 24)	4.00c
Galv. corrug. sheets	4.64c
Structural rivets	3.99c
Boiler rivets	4.09c
Tank rivets, 7/16 in. and smaller	55
Machine and carriage bolts, lag screws	
Fittings up bolts, bolt ends, plow bolts	
Hot-pressed nuts, square and hexagon, tapped or blank, semi-finished nuts	
All quantities	70

\*No. 26 and lighter take special prices.

## PHILADELPHIA

	Base per Lb.
*Plates, 1/4 in. and heavier	2.95c
*Structural shapes	2.95c
*Soft steel bars, small shapes, iron bars (except bands)	2.90c
*Reinforce steel bars, sq. twisted and deformed	2.95c
Cold-finished steel bars	3.73c
*Steel hoops, No. 12 and 3/16 in. incl.	3.40c
Incl.	3.15c
Spring steel	5.00c
*Hot-rolled anneal. sheets (No. 24)	3.55c
*Galvanized sheets (No. 24)	4.25c
*Hot-rolled annealed sheets (No. 10)	3.05c
Diam. pat. floor plates, 1/4 in.	4.95c
Swedish iron bars	6.25c

These prices are subject to quantity differentials except on reinforcing and Swedish iron bars.  
\*Base prices subject to deduction on orders aggregating 4000 lb. or over.  
†For 50 bundles or over.  
‡For less than 2000 lb.

## CLEVELAND

	Base per Lb.
Plates and struc. shapes	3.31c
Soft steel bars	2.95c
Reinforce steel bars	2.10c
Cold-finished steel bars	3.40c
Flat-rolled steel under 1/4 in.	3.36c
Cold-finished strip	3.90c
Hot-rolled annealed sheets (No. 24)	3.96c
Galvanized sheets (No. 24)	4.61c
Hot-rolled sheets (No. 10)	3.11c
Hot-rolled 3/16 in. 24 to 48 in. wide sheets	3.56c
Black ann'l'd wire, per 100 lb.	\$2.65
No. 9 galv. wire, per 100 lb.	3.00
Com. wire nails, base per keg	2.40

\*Plus mill, size and quantity extras.  
†Outside delivery 10c. less.

## CINCINNATI

	Base per Lb.
Plates and struc. shapes	3.40c
Bars, soft steel or iron	3.15c
New billet reinforce bars	3.25c
Rail steel reinforce bars	3.25c
Hoops and bands, 3/16 in. and lighter	3.45c
Cold-finished bars	3.75c
Hot-rolled annealed sheets (No. 24)	4.00c
Galv. sheets (No. 24)	4.70c
Hot-rolled sheets (No. 10)	3.20c
Structural rivets	4.35c
Small rivets	55 per cent off list
No. 9 ann'l'd wire, per 100 lb. (1000 lb. or over)	\$2.91
Com. wire nails, base per keg:	
1 to 24 kegs	3.50
25 to 50 kegs	3.30
Large quantities	3.10
Cement c'd nails, base 100-lb. keg	3.50
Chain, 1-in., per 100 lb.	8.55
Seamless steel boiler tubes, 2-in.	\$19.03
4-in.	44.96
Lap-welded steel boiler tubes, 2-in.	18.10
4-in.	42.32

## BUFFALO

	Base per Lb.
Plates	3.37c
Struc. shapes	3.25c
Soft steel bars	3.00c
Reinforcing bars	2.60c
Cold-fn. flats and sq.	3.55c
Round and hex.	3.55c
Cold-rolled strip steel	3.19c
Hot-rolled annealed sheets (No. 24)	4.05c
Heavy hot-rolled sheets, 3/16 in., 24 to 48 in. wide	3.62c
Galv. sheets (No. 24)	4.70c
Bands	3.42c
Hoops	3.42c
Hot-rolled unannealed sheets	3.17c
Com. wire nails, base per keg	\$3.35
Black wire, base per 100 lb.	3.55

## BOSTON

	Per Lb. Base
Beams, channels, angles, tees, zees	3.52c
H beams and shapes	3.52c
Plates—sheared, tank and univ. mill.	3.52c
1/4 in. thick and heavier	3.53c
Floor plates, diamond pattern	5.33c
Bar and bar shapes (mild steel)	3.30c
Bands 3/16 in. thick and	
No. 12 ga. incl.	3.60c to 4.60c
Half rounds, half ovals, ovals and bevels	4.55c
Tire steel	4.55c
Cold-finished rounds, squares and hexagons	4.00c
Cold-rolled strip steel	3.245c

Cold-finished flats	3.85c
Blue annealed sheets, No. 10 gal.	3.60c
One pass cold-rolled sheets No. 24 ga.	4.15c
Galvanized steel sheets, No. 24 ga.	4.85c
Lead coated sheets, No. 24 ga.	5.80c

Prices delivered by truck in metropolitan Boston, subject to quantity differentials.

## MILWAUKEE

	Base per Lb.
Plates and structural shapes	3.31c
Soft steel bars	3.06c
Hot-rolled strip	3.41c
Hot-rolled sheets (No. 10)	3.16c
Hot-rolled annealed sheets (No. 24)	3.96c
Galvanized sheets (No. 24)	4.66c
Cold-finished steel bars	3.61c
Cold-rolled strip	3.90c
Structural rivets (keg lots)	3.86c
Boiler rivets (keg lots)	3.96c
Track spikes (keg lots)	3.71c
Track bolts (keg lots)	4.86c
Black annealed wire	3.10c
Com. wire nails	2.90c
Cement coated nails	2.90c
Machine bolts	Per Cent Off List
Carriage bolts	70
Hot-pressed nuts, sq. and hex., tapped or blank (keg lots)	70

Prices given above are delivered Milwaukee.

On plates, shapes, bars, hot-rolled strip and heavy hot-rolled sheets, the base applies on orders of 400 to 9999 lb. On galvanized and No. 24 hot-rolled annealed sheets the prices given apply on orders of 400 to 3499 lb. On cold-finished bars the prices are for orders of 300 to 499 lb.

## PACIFIC COAST

	Base per Lb.
	San Fran. Los Ancl. Seattle
Plates, tank and U. M.	3.55c 3.70c 3.55c
Shapes, standard	3.55c 3.70c 3.55c
Soft steel bars	3.60c 3.70c 3.60c
Reinforcing bars	3.50c 3.50c 3.50c
Hot-rolled annealed sheets (No. 24)	4.40c 4.45c 4.40c
Hot-rolled sheets (No. 10)	3.75c 3.80c 3.75c
Galv. sheets (No. 24)	5.00c 5.05c 5.00c
Cold finished steel:	
Rounds	5.95c 5.95c 4.75c
Squares and hexagons	7.20c 7.20c 6.00c
Flats	7.70c 7.70c 7.00c
Common wire nails—base per keg	
less carload	\$3.40 \$3.25 \$3.30

All items subject to differentials for quantity.

## TOOL STEEL

Prices are same for warehouse distribution at all points on or East of Mississippi River. West of Mississippi quotations are 1c. a lb. higher.

	Base per Lb.
High speed	57c
High carbon chrome	37c
Oil hardening	22c
Extra	17c
Regular	14c

## Weekly Indications of Steel Activity

	From THE IRON AGE				Average, Year to Date	
	Mar. 12, 1935	Mar. 5, 1935	Feb. 12, 1935	Mar. 13, 1934	1935	1934
Steel ingot operations—Per cent of capacity	47.5	48.5	53.5	48.5	50.0	39.1
	Week Ended				Year to Date	
	Mar. 12, 1935	Mar. 5, 1935	Feb. 12, 1935	Mar. 13, 1934	1935	1934
Fabricated structural steel awards	6,450	9,300	9,655	14,800	117,815	159,415
Fabricated plate awards	1,325	2,800	1,130	1,897	19,360	15,562
Sheet steel piling awards	0	0	0	430	2,400	13,495
Reinforcing bar awards	2,250	1,575	615	3,050	41,690	45,200

THE IRON AGE, March 14, 1935—65



# Copper Market Awaiting Developments Of Conferences—Tin Quiet

## Zinc Well Sustained at Recently Advanced Prices—Demand For Lead Is Steady Although Not Large

NEW YORK, March 12.—Demand for copper seemed to ease off slightly last week in anticipation of the international conference on production curtailment which was scheduled to get underway here yesterday. However, buying on Monday was again quite brisk, with sales having amounted to more than 2000 tons. Up until today, March transactions had totaled about 10,500 tons. The proceedings of the curtailment conference are naturally being guarded with the utmost secrecy, and no statement on the subject can be expected until agreements are reached. In the meantime, sentiment continues rather buoyant. While none of the very large buyers of copper has been in the market, small fabricators are taking regular supplies and consumption seems to be well sustained. The

Blue Eagle price is unchanged at 9c. a lb., delivered Connecticut Valley, and the London quotation on electrolytic this morning ranged from 6.65c. to 6.70c. a lb., usual Continental base ports.

### Tin

The tin market has been quiet in the past week and little activity is expected until after March 14, when an international meeting will be held to fix production quotas for the next quarter. It is generally believed that the quotas will be raised at least 5 per cent, but this action would not likely have an appreciable effect upon prices. Buying in this country has been decidedly light, even though tin plate operations are stronger. In England, the market has fluctuated quite a little, and the movement has been accentuated here by

changes in sterling exchange. The New York market was quotable today at 46.80c. a lb. In London, spot tin was quoted today at £218 15s. and futures at £213 15s., while straits metal was available at £221 5s. The market in the East had declined to £218 17s. 6d. The International Tin Research and Development Council has issued detailed statistics on world consumption, revealing that 1934 brought a slight decrease, or from 134,000 gross tons in 1933 to 130,000 tons last year. In 1923, consumption was only 106,000 tons.

### Lead

Demand for lead is steady, although strictly of a hand-to-mouth character. Practically all of the principal consuming industries are in the market from time to time, but they are buying only for their own immediate needs, and the March position is by no means sold up. Prices are very steady, and, although too low to be profitable, no intimation of an advance is noticed. The majority of sellers are quoting 3.40c. a lb., St. Louis, and 3.55c. a lb., New York, although one large interest is still getting a premium of \$1 a ton on sales in the East.

### Zinc

The \$4 a ton price advance which took place early in the month seems to be holding very well. No sales of Prime Western at less than 4.25c. a lb., New York, and 3.90c., East St. Louis, have been reported in the last week, and the increase does not seem to have affected demand as adversely as might have been expected. Sales last week amounted to about 3700 tons. While this total was considerably below the 7000-ton level reached in the preceding comparable period, it was only slightly below the total reported in the previous week and may be considered about normal. Zinc producers are somewhat disappointed at the current trend in the galvanizing industry, which is contrary to seasonal expectations. However, they feel that the approach of warmer weather is certain to have a favorable effect. The Prime Western Zinc Producers' Committee of the American Zinc Institute, Inc., reports that February sales of Prime Western for delivery during that month amounted to 4437 tons, at an average weighted selling price of 3.708c. a lb., East St. Louis. February sales for subsequent delivery amounted to 8574 tons at a weighted average price of 3.754c. a lb. Prices on zinc concentrates are unchanged at \$25 and \$26 a ton. Sales last week amounted to about 5000 tons against production of 8500 tons and shipments of 6200 tons.

### The Week's Prices. Cents Per Pound for Early Delivery

	Mar. 6	Mar. 7	Mar. 8	Mar. 9	Mar. 11	Mar. 12
Electrolytic copper, N. Y.*	8.75	8.75	8.75	8.75	8.75	8.75
Lake copper, N. Y.	9.12½	9.12½	9.12½	9.12½	9.12½	9.12½
Straits tin, Spot, New York	46.50	46.37½	47.50		47.00	46.80
Zinc, East St. Louis	3.90	3.90	3.90	3.90	3.90	3.90
Zinc, New York	4.25	4.25	4.25	4.25	4.25	4.25
Lead, St. Louis	3.40	3.40	3.40	3.40	3.40	3.40
Lead, New York	3.55	3.55	3.55	3.55	3.55	3.55

\*Refinery quotations; price ¼c. higher delivered in Connecticut.

Aluminum, virgin 99 per cent plus, 19c. to 22c. a lb., delivered.

Aluminum, remelt No. 12 (alloy), carload lots delivered, 14c. a lb., average for week.

Nickel electrolytic cathode, 35c. a lb., delivered; shot and ingot, 36c. a lb., delivered.

Antimony, 14.50c. a lb., New York.

Brass ingots, 85-5-5-5, 8.25c. a lb., New York and Philadelphia.

### From New York Warehouse

Delivered Prices, Base per Lb.	
Tin, Straits pig	49.00c. to 50.00c.
Tin, bar	51.00c. to 52.00c.
Copper, Lake	10.25c. to 11.00c.
Copper, electrolytic	10.00c. to 10.50c.
Copper, castings	9.75c. to 10.75c.
*Copper sheets, hot-rolled	16.00c.
*High brass sheets	14.25c.
*Seamless brass tubes	16.00c.
*Seamless copper tubes	16.25c.
*Brass rods	12.75c.
Zinc, slabs	5.75c. to 6.75c.
Zinc, sheets (No. 9), casks, 1200 lb. and over	10.25c.
Lead, American pig	4.50c. to 5.50c.
Lead, bar	5.50c. to 6.50c.
Lead, sheets	7.25c.
Antimony, Asiatic	15.50c. to 16.50c.
Alum., virgin, 99 per cent, plus	23.30c.
Alum., No. 1 for remelting, 98 to 99 per cent	18.00c. to 19.00c.
Solder, ½ and ⅓	30.00c. to 31.00c.
Babbitt metal, commercial grades	25.00c. to 60.00c.

\*These prices are also for delivery from Chicago and Cleveland warehouses.

### From Cleveland Warehouse

Delivered Prices per Lb.	
Tin, Straits pig	51.00c.
Tin, bar	53.00c.

Copper, Lake	10.00c.
Copper, electrolytic	10.00c.
Copper, castings	9.75c.
Zinc, slabs	5.50c. to 6.75c.
Lead, American pig	4.50c. to 4.75c.
Lead, bar	7.75c.
Antimony, Asiatic	16.50c.
Babbitt metal, medium grade	18.50c.
Babbitt metal, high grade	56.00c.
Solder, ½ and ⅓	31.25c.

### Old Metals, Per Lb., New York

Buying prices are paid by dealers for miscellaneous lots from smaller accumulators, and selling prices are those charged to consumers after the metal has been prepared for their uses. (All prices are nominal.)

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible	5.62½c.	6.37½c.
Copper, hvy. and wire	5.50c.	6.00c.
Copper, light and bottoms	4.50c.	5.00c.
Brass, heavy	2.87½c.	3.50c.
Brass, light	2.12½c.	2.87½c.
Hvy. machine composition	4.50c.	5.00c.
No. 1 yel. brass turnings	3.87½c.	4.37½c.
No. 1 red brass or compos. turnings	4.12½c.	4.62½c.
Lead, heavy	2.62½c.	3.00c.
Zinc	2.00c.	2.37½c.
Cast aluminum	10.12½c.	11.25c.
Sheet aluminum	11.50c.	13.00c.



## Railroad Equipment

Louisiana & Arkansas is asking for bids on four Mikado type locomotives.

Erie is inquiring for 55 steel frame milk cars.

Waco, Beaumont, Trinity & Sabine receivers have been authorized by ICC to borrow \$260,000 from PWA for financing improvements, including \$49,984 for tracks and trestles.

Wheeling & Lake Erie is planning to build five freight locomotives in its Brewster, Ohio, shops and has an inquiry out for parts.

### RAILS

Union Pacific has bought 19,000 tons of rails.

New York Central has ordered 20,000 tons of rails, of which 10,660 tons was placed with Illinois Steel Co. and 9340 tons with Bethlehem Steel Co.

Atlantic Coast Line's order for 5000 tons of rails is being rolled by Tennessee Coal, Iron & Railroad Co. instead of by another Steel Corporation subsidiary, as reported last week.

## Cast Iron Pipe

Chicago has awarded 900 tons of 20 and 24-in. to Lynchburg Foundry Co. and 2300 tons of larger sizes to United States Pipe & Foundry Co.

Chicago will open bids March 15 on 2100 tons of small sizes.

Wilmette, Ill., is inquiring for 600 ft. of 6-in.

Burgaw, N. C., closes bids March 21 for 27,720 ft. of 2, 6 and 8-in. for water lines. J. B. McCrary Co., Atlanta, Ga., is consulting engineer.

Minden, Mich., plans water pipe lines. Fund of \$70,000 is being arranged for this and other waterworks installation. Francis Engineering Co., Saginaw, Mich., is consulting engineer.

Wingo, Ky., asks bids until March 22 for water pipe lines; also for 75,000-gal. tank on 100 ft. tower and other waterworks equipment. Fund of \$36,000 has been authorized. J. S. Watkins, Citizens Bank Building, Lexington, Ky., is consulting engineer.

Seal Beach, Cal., plans pipe lines for water system. Special election has been called for March 29 to vote bonds for \$30,000 for this and other waterworks installation. Victor Hayes, 302 East Anaheim Street, Long Beach, Cal., is consulting engineer.

Russell, Kan., plans water pipe lines; also pumping station and other waterworks installation. Special election has been called for April 1 to vote bonds for \$120,000 for work. Black & Veatch, Mutual Building, Kansas City, Mo., are consulting engineers.

Cotuit, Mass., plans pipe lines for water system; also new pumping plant, elevated steel tank and tower, and other waterworks equipment. Fund of \$130,000 is being arranged. Whitman & Howard, 89 Broad Street, Boston, are consulting engineers.

Sperryville, Va., plans water pipe lines. Special election has been called for March 26 to vote bonds for \$25,000 for this and other waterworks installation.

Xenia, Ohio, closes bids March 25 for water pipe lines; also for deep-well pumping machinery and other waterworks equipment. M. C. Smith is city manager. H. Collins Wight, Union Trust Building, Dayton, Ohio, is consulting engineer.

Elkbridge, Md., plans pipe lines for water system. Bond issue of \$80,000 is being sold.

Montrose, Mich., plans pipe lines for water supply. Cost about \$40,000 with other waterworks installation. Francis



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*Manufacturers of*  
**Cold Drawn Steels**

**Turned and Polished Shafting Turned and Ground Shafting**

Engineering Co., Saginaw, Mich., is consulting engineer.

Marion, Wis., has low bid from James B. Clow & Sons on 16,700 lin. ft. of 6-in. and 5790 lin. ft. of 8-in. class C.

Stratford, Wis., has low bid from United States Pipe & Foundry Co. on 4000 lin. ft. of 8-in.

Tremonton, Utah, will take bids March 19 on 8350 ft. C. C. Roskelley, Brigham City, Utah, is engineer.

## Pipe Lines

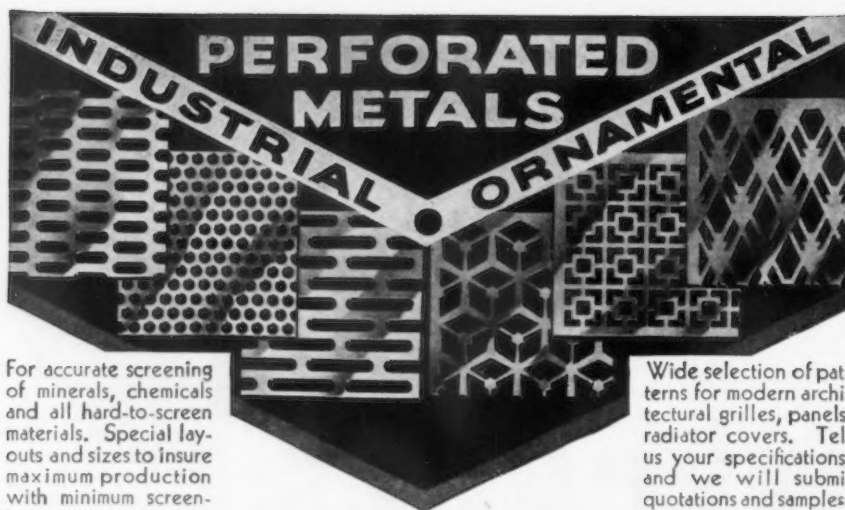
Niagara Falls, N. Y., asks bids until March 21 for 2210 ft. 54-in. welded steel pipe from ½-in. steel plate for new water line from municipal pumping station to in-

take water crib. W. D. Robbins, City Hall, is city manager.

General Pipe Line Co. of California, 108 West Second Street, Los Angeles, plans new welded steel pipe in part of city and vicinity. Cost about \$1,500,000. Company is affiliated with General Petroleum Corp. of California, same address.

Lindsborg, Kan., let contract to C. L. Burt, Hutchinson, Kan., for steel pipe lines for municipal gas distribution. Cost about \$55,000. F. E. Devlin, Wheeler-Kelly-Hagney Building, Wichita, Kan., is consulting engineer. Natural gas will be secured from Dickey Oil & Refining Co., Wichita and McPherson, Kan., which plans welded steel pipe line from gas fields near Chindberg, Kan., to Lindsborg and vicinity. Cost over \$60,000.

Pennsylvania Railroad Co., 15 North Thirty-second Street, Philadelphia, closes



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CHICAGO, ILLINOIS

bids March 19 for steel pipe (Contract 3-1935); also for steel boiler tubes.

**American-Michigan Pipe Line Co.**, Muskegon, Mich., associated with Muskegon Gas Co., Muskegon, both subsidiaries of American Light & Traction Co., 105 West Adams Street, Chicago, plans extensions in steel pipe line gathering system in gas fields in Austin district, Mecosta County, for natural gas supply from properties of H. C. Nelson, Austin pool, independent oil and gas operator, who will also construct new steel pipe line from wells to connection with system of first noted company. Project has been approved by State Utilities Commission.

**Champlin Refining Co.**, Enid, Okla., has purchased from Youngstown Sheet & Tube Co., Youngstown, Ohio, approximately 10,000 tons of 6½-in. o.d. seamless pipe for 250-mile line from Enid, Okla., to Superior, Neb.

## Public Projects Up For Bids on Coast

**SAN FRANCISCO**, March 11.—Approximately 16,110 tons of steel are involved in a spillway gate structure, a cut-off structure, 7000 ft. of channels and other appurtenant works at Fort Peck dam, near Glasgow, Mont. The project, to be located three miles east of the dam, will require 11,168 tons of reinforcing bars, 4317 tons of structural steel, 115 tons of steel sealing strips and 510 tons of miscellaneous steel. Bids will be opened April 3 in the United States Engineers office, Kansas City.

At San Francisco the Pacific Bridge Co. is low bidder on the steel alternate for the construction of the Hetch Hetchy Trans-Bay pipe line crossing. Approximately 1300

tons of plates or 5000 tons of cast iron pipe are specified under the alternates. Bids are to be taken soon at Tacoma, Wash., for the third unit of the Green River pipe line, in which approximately 1900 tons of plates will be used. Bids on the auditorium at Fresno, Calif., were rejected and plans will be revised. Original specifications included 400 tons of structural steel and 460 tons of reinforcing bars.

McClintic-Marshall Corp. is reported to have taken 800 tons of structural steel for a post office at Phoenix, Ariz. An award has not yet been made for the 150 tons of reinforcing bars required for the building. Business on the Pacific Coast seems to be marking time and the anticipated increase in trade has not fully materialized.

## Youngstown to Enter Stamped Metal Field

**YOUNGSTOWN** Metal Products Co., Youngstown, Ohio, has been organized as a subsidiary of the Youngstown Sheet & Tube Co., to fabricate into various semi-finished forms products of its new continuous hot and cold strip mills. Existing buildings at the company's Brier Hill plant will be utilized for the new fabricating plant. Equipment is now being purchased and operation of the plant is expected to be started within 90 days.

## Steel Rate Unchanged At Buffalo

**BUFFALO**, March 12.—Average B ingot output in this district is unchanged at 38 per cent of capacity. Operations of Buffalo steel plants have declined to 35 per cent of capacity. Eight open-hearths are active at the Lackawanna plant of the Bethlehem Steel Corp., while two are operating at Wickwire-Spencer Corp. and four at Republic Steel Corp. The Seneca sheet division of Bethlehem is still running at 75 per cent.

Numerous small structural jobs are reported but there are few sizable projects. A Pittsburgh company will fabricate 250 tons of plates for two 1,000,000-gal. standpipes for the State of New York at Poughkeepsie. The McLain Construction Co. of Buffalo is low bidder on a 200-ton bridge job for the State at Olcott, N. Y.

Pig iron business has shown no noticeable gain since the opening of the books for second quarter the first of the month.

Sizable scrap shipments are moving into all steel plants, but there is almost no new buying. Recent railroad lists are understood to have gone to Bethlehem, Pa., and Johnstown, Pa. The largest scrap consumer in the district is offering \$10.50 now for No. 1 steel, but is getting little or no material.

The foundation contract for the new Bethlehem sheet-strip mill at Lackawanna has been let to James Stewart & Co. of New York, and the work has started.

## Alloy Steels Slash Weight in New Haven Coaches

**THE** last car of an order for 50 semi-streamlined, air-conditioned passenger coaches has been placed in service on the lines of the New York, New Haven & Hartford. While the average weight of a typical air-conditioned passenger coach is approximately 146,000 lb., the use of alloy steels in the construction of the new semi-streamlined air-conditioned cars has reduced the weight to about 100,000 lb., or a reduction of 46,000 lb. per car. In a nine-car train the saving in weight would amount to 414,000 lb., or an amount equivalent to four of the new coaches.

## How Attractive Finish Helps Metal Products Sales

(CONCLUDED FROM PAGE 17)

company. Some manufacturers use a lower temperature for the second and subsequent coats. Thus one manufacturer uses 1600 deg. F. for the ground coat, 1520 deg. F. for the second coat, and 1490 deg. F. for the third coat.

The coating used by most enamellers of small parts is a complex mixture and because it varies from shop to shop no detailed information can be given here. The report of the Porcelain Enamel Institute gives the chief ingredients as nitrate of soda from Chile and Russia, vallendar clay from Germany, cryolite from Greenland, nickel oxide and cobalt from Canada, manganese from Newfoundland, feldspar, quartz, fluorspar, soda ash, and borax from the United States. These materials in proper proportions are first ground and thoroughly mixed. The mixture is then smelted at high temperature into a molten glass-like mass. It is held at high temperature for seasoning and then is released into a tank of water where, because of sudden contraction, it breaks up into relatively small fragments. These fragments form the raw material used in producing the enamel and are generally known as frit, which has a production in this country said to be in excess of 50,000,000 lb. a year.

One method of application of vitreous enamel which is highly special should perhaps be mentioned. This method is to heat the steel or other base metal to a white hot temperature and to spray powdered enamel on to it. In one case steel strip in a continuous process is vitreous enameled by this means, the strip passing through an electrically heated zone immediately before it comes to the spray station.

Those who have studied the porcelain enamel industry from the commercial viewpoint are optimistic about the future. During the depression years, in spite of the higher cost of vitreous enamels, their use in many fields increased in comparison with the use of non-porcelain enamels and lacquers. Keen competition among metal finishes exists in the refrigerator

**Baked at 212°F.  
for 2 YEARS**

## *This AIR-DRY FINISH did not Chip, Flake or Peel*

ONE of our customers finished an aluminum fan blade with *Flexible Blue Knight BLAX*.\* In a constant temperature steam oven their previous material brittle after two days at 212° F. After two years at 212° F., *Flexible Blue Knight BLAX*\* still showed its original Flexibility and Adhesion. This accelerated aging or brittling test indicates that parts or products finished with these ONE-COAT, AIR-DRY materials can be stored for long periods (years) without fear or loss due to brittling, chipping, flaking.

### Can Be Blanked and Formed

*Flexible Blue Knight BLAX* (and colors) are on a lot of dash-board instrument faces today. In many cases, these dials are finished in the flat sheet . . . then blanked and formed. The finish that stands these operations can take the roughest handling, contact with tools and the knocking-around of ASSEMBLY OPERATIONS . . . also without flaking, chipping or peeling.

### Unwritten Insurance

Even though your finished product may not be subjected to rough treatment, the ability of *Flexible Blue Knight BLAX* (and colors) to stand up under abuse indicates resistance to chipping and flaking—INSURANCE that the finish on your products will be

fault-free when they leave your plant . . . be fault-free when your customer gets them . . . and, under actual and ultimate service use, this fault-freeness minimizes possible complaint of finish-failure.

\*Also available in colors.



**YOU CAN PERFORM  
THIS SIMPLE TEST**

*Seated at  
your DESK*

● For demonstration, ask us to send you three finished strips (1) Steel (2) Aluminum (3) Brass. You are to twist, bend, finger-nail or abuse them in any fash on you devise. A booklet titled "*How Good Are You at Twisting and Bending*" will accompany the strips. These metal strips are finished with one-coat, air-dry *Flexible Blue Knight BLAX*\*, which, for ten years, have astonished manufacturers in many metal-working industries.

**ROXALIN**  
*Flexible*  
CELLULOSE & SYNTHETIC  
**FINISHES**

ROXALIN FLEXIBLE LACQUER CO., Inc.  
802 MAGNOLIA AVE., ELIZABETH, N. J.

field, but porcelain has gradually gained over others and now enjoys some 50 per cent of the total. In the case of washing machines, the proportion is even higher, and in the manufacture of small parts, porcelain enamel is being introduced on a constantly increasing variety of metal items.

The chief objection to the use of porcelain enamel as a popular finish for metal lies in the fact that

it has to be baked or fired at a relatively high heat. But here also the future may bring some favorable changes. Research workers already claim progress in the direction of lower firing temperatures, and from England comes the report of a new thermoplastic synthetic resin with glass-like properties which may lead to a metal coating intermediate between the vitreous and non-vitreous enamels.



## HAVE YOU A CLUTCH PROBLEM?

—One where synchronization, remote control, operating safety and dependability is demanded?

There isn't any better solution than a Dings Magnetic Clutch.

Dings Magnetic Clutches will answer your demands for strength, quick action and long life.

There is a size for every problem. Let us tell you what we can do.



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Since 1899 Dings engineers have been building magnetic equipment. Here is experience that no other manufacturer of this type of equipment can offer. Such experience has a real dollars and cents value to you.

## Demand Continues to Fall Off in Philadelphia Area



District Operating Rate Recedes Two Points to 34 Per Cent—Alan Wood Will Blow in Swedeland Furnace in April

PHILADELPHIA, Mar. 12.—The high hopes with which the steel fraternity in this area welcomed the new year have definitely given way to widespread doubt as to what is in store for the second quarter. Most of the smaller mills have had little or no share in the liberal automobile tonnages released in the Middle West, and these same mills are today faced with a noticeable slackening in carlot and less-than-carlot miscellaneous business. There is no indication that the railroad shops in this territory will soon buy steel in any appreciable quantities, and the shipbuilders here have little in prospect. Even though the Federal Government appropriates several billions of dollars for new projects, there is little likelihood that the impetus of such spending will be felt here for many months.

All the above factors are having an influence on mill operations in eastern Pennsylvania. For several

months operations have fluctuated around 35 per cent, and the shutting off of several furnaces during the past week has served to reduce the district rate to 34 per cent.

In States further south, sellers of wire nails are encountering serious competition from German makers. So far this competition has not been felt in the immediate Philadelphia area, probably as the result of the boycott on German goods which is in effect here.

Several independent washer makers in eastern Pennsylvania may object to the Iron and Steel Institute ruling against the sale of washer stock or washer scrap at regular scrap prices. New prices which have been filed on this product indicate a rise of about \$10 a ton over levels previously in force. This scrap may be sold at the former lower price if it is to be exported or remelted, but makers

of washers and small stampings must pay the higher price.

### Pig Iron

Shipments on old orders are showing no tendency to fall off, but new business is limited to small orders for early delivery. Gray iron foundries in this area are melting in unchanged volume, but there is somewhat less basic and specialty iron being melted in steel foundries and mills. The Alan Wood Steel Co. has definitely decided to blow in its Swedeland furnace early in April; this furnace and the stacks operated by Bethlehem will be the only ones in blast in this district.

### Sheets and Strip

Miscellaneous consumer demand for blue annealed sheets is not so active as earlier in the year. Local autobody stamping plants and makers of steel shelving are using considerable quantities of full-finished material each week, but their requirements are being filled mainly from old orders. New business in these grades consists mostly of small tonnages for delivery as quickly as possible. A significant condition is the current quick delivery obtainable on automobile grades as compared with the many delays in evidence a month ago. There is little or no market for strip; radio makers are taking occasional tonnages, but other outlets are generally inactive.

### Bars, Plates and Shapes

All sellers are anxiously awaiting the disposition of the steel tonnages for the Erie ferryboat which is being built by Sun Shipbuilding Co. Other projects of interest consist of 500 tons of structural shapes and miscellaneous steels for a warehouse of the Continental Distilling Co., and a projected one-half million dollar dredge rebuilding job which the American Dredging Co. may soon let to a local shipbuilder. The one structural steel award of the week consisted of 150 tons for a railroad bridge at Newark, N. J., which was let to Phoenix Bridge Co. Active tonnages total about 500 tons, and include a hospital at Scranton, Pa., a factory at Hazelton, Pa., and an addition to the Armstrong Cork Co. building at Lancaster, Pa. No bar sales of any size were made during the week.

### Warehouse Business

No price changes have been made nor are there any in prospect. Most sellers are experiencing a sustained demand for corrugated sheets and full-finished seconds, but sales of other products have shown a tendency to slacken.

## Imports

The following iron and steel imports were received here last week: 848 tons of pig iron from British India and ½ ton of steel wire from England.

## Scrap

Bethlehem has bought No. 1 steel for several district mills at \$10, directly from dealers. However, most brokers are not willing to sell tonnages much under the \$11 level; consequently this grade is currently quoted at \$10 to \$11. In view of the lack of test sales, no changes have been made in other grades. This district continues primarily interested in export shipments; one boat is currently loading at Port Richmond and two other boats are expected to dock before the end of the week. These three boats should about clean up the heavy accumulations of steel at Port Richmond. Stove plate is being purchased for export, and turnings are being delivered to Port Richmond, probably also for export. Nearby foundries are buying occasional carlots of cupola cast, but the total quantity of cast material going to this outlet has decreased considerably during the past few weeks.

## Canadian Business On Even Keel

**T**ORONTO, ONT., March 12.—While there is a steady flow of new business in the Canadian iron and steel markets, no large tonnage awards have been made recently. Rail and rolling stock contracts from the railroads are pending, but no actual contracts have been placed, owing to financing problems. Some of the steel mills are looking for new business from British Dominions, as well as from England, and it is said that results in this respect have been satisfactory. The Dominion Steel & Coal Corp. is shipping iron ore from Wabana to England and to Germany on old contract account.

The automotive industry is now in full production getting out cars and trucks for spring delivery, and substantial orders for raw materials are originating from this source. Sheet sales have shown favorable improvement of late and there is a good demand for screws, nuts, bolts, etc. A good flow of orders for mill equipment, mining plant and small tools, etc., is reported from the mining industry and thousands of tons of machinery and supplies are moving to the various mining areas of the Dominion, timed to arrive at their destination before the spring break-up.

Pig iron sales are holding at a

steady level. There is a good demand for foundry iron for spot delivery and repeat orders are more frequent, but no future delivery contracts are being placed. Total bookings are averaging about 600 tons a week. Three blast furnaces are blowing, with production around 45,000 tons per month. Only a small tonnage of special grade iron is being imported into Canada at this time. Prices are firm and unchanged.

Demand for iron and steel scrap gradually is expanding. While the greater part of the movement at this time is in steel grades, going to the mills in the Hamilton district and also to mills in the Montreal area, some improvement has been reported in iron scrap lately. Montreal dealers report inquiries for scrap from Britain, and it is understood that some big tonnages will be shipped on this account during the coming season. Dealers have made no revision in price lists recently and are out of the market except for a few special grades.

## Reinforcing Steel

Awards 2250 Tons—New Projects  
23,865 Tons

### AWARDS

**Togus, Me.**, 600 tons, Soldiers' Home, to Northern Steel Co.

**Hartford, Conn.**, 150 tons, college unit, to Sherer Steel Co.

**Bronx, N. Y.**, 250 tons, apartment building, to Kalman Steel Corp.

**Michigan City, Ind.**, 600 tons, water plant, to Concrete Steel Co.

**Chicago**, 238 tons, Brach Candy Co., to Joseph T. Ryerson & Son.

**Chicago**, 100 tons, Wander Co., to an unnamed bidder.

**Camarillo, Cal.**, 206 tons, State hospital buildings, to an unnamed bidder.

**Los Angeles**, 100 tons, alterations at McKinley school, to an unnamed bidder.

### NEW REINFORCING BAR PROJECTS

**Cleveland**, 100 tons, building for Telling Belle Vernon Co.

**Huron, Ohio**, 100 tons, Wheeling & Lake Erie dock work.

**Alton, Ill.**, 1400 tons, dam No. 26 in Mississippi River; bids April 11 by United States Engineer's Office, St. Louis.

**Chicago**, 11,000 tons, Stickney Sanitary District project; bids March 28.

**Chicago**, 750 tons, west side sewer for Sanitary District; bids March 14.

**Chicago**, 475 tons, Goldblatt department Store; previously reported as 150 tons.

**Milwaukee**, 3000 to 4000 tons, filter plant; new bids being taken.

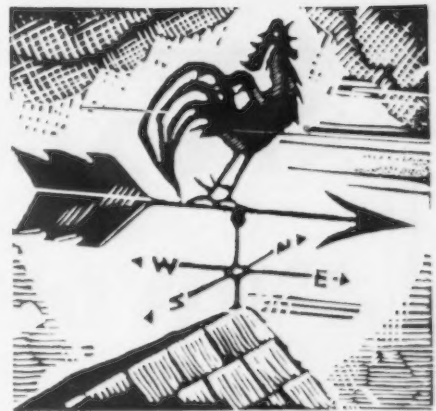
**Fort Peck, Mont.**, 11,168 tons, spillway gate structure, cut-off structure and appurtenant works, Specification No. 35-225; bids April 3.

**Fresno, Cal.**, 460 tons, city auditorium; bids rejected and plans will be revised.

**Fresno**, 400 tons, Hall of Records; bids March 19.

**Huntington Park, Cal.**, 125 tons, school reconstruction; bids under advisement.

**Ontario, Ore.**, 295 tons, Succor Creek division of Owyhee project; bids April 3.



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We, like other users of machinery, have found that the use of welded rolled steel in construction of machinery provides greater strength, reduced weight and lower costs. Naturally we specify such construction, wherever practical, in the equipment we buy. This explains why the trend of a few years ago toward the use of welded rolled steel has now developed into established practice with many progressive manufacturers.

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*United States Steel Corporation Subsidiaries*

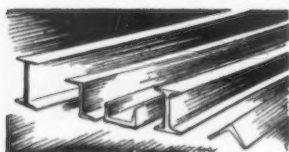


# SPONGE IRON and POWDER IRON for Metallurgical and Chemical Use

Steels made with SWEDISH SPONGE IRON as a raw material show a VIBRATION DAMPING CAPACITY TWICE that of similar steels made with scrap as a raw material. References: Report of Investigations, Bureau of Mines, R. I. 3229, page 63.—Obtainable from us or directly from B. M.

**EKSTRAND & THOLAND, INC.**  
122 E. 42nd ST., NEW YORK CITY  
DETROIT—CHICAGO

## Further Recession in Steel Demand at Cleveland



Ingot Rate Is Off Two Points to 61 Per Cent—Orders From Household Equipment Makers Improve—Rivet Prices Reaffirmed

CLEVELAND, March 12.—Demand for finished steel shows a moderate downward tendency. New business from the automotive industry has subsided somewhat following the placing at the first of the month of considerable tonnage of sheets for April shipment. However, sheet mills have on order all the sheets they can produce this month and are maintaining capacity operations. Some of the sheet mills have taken enough business for April to keep them well filled through that month. While orders for sheets by stamping plants in this territory doing automotive work have subsided, the decline in demand from this source has been offset by an increase in the volume of business from manufacturers of stoves, refrigerators and other household equipment. Metal sign manufacturers are also ordering quite freely. The demand at present is largely for enameling sheets.

Ingot output in the Cleveland-Lorain territory declined two points this week to 61 per cent of capacity, one open-hearth furnace in Lorain being taken off. Consumers are ordering steel as needed and are showing no interest in second quarter contracts.

Demand from railroads has become somewhat more active, some sizeable orders for material for car repair work being placed during the week. The Wheeling & Lake Erie plans to build five locomotives in its own shops and has sent out inquiries for all the parts required for building these locomotives.

Inquiry in the construction field is still light. Demand for steel for highway bridge work in Ohio has tapered off.

Present rivet prices have been reaffirmed for the second quarter.

### Pig Iron

Consumers are buying very conservatively and only for their early

needs. Because of this policy, sales so far this month for delivery during the second quarter have been considerably lighter than during the corresponding period of December, when foundries bought quite freely for the first quarter. The automotive industry continues to supply most of the business. New orders from that source included one for 1500 tons. Sales aggregating over 4000 tons were made by one Lake furnace during the week. Shipments are holding up remarkably well so far this month, being considerably ahead of the corresponding period of February. Jobbing foundries are not very active.

### Bars, Plates and Shapes

Demand for these products is not holding up to the February volume. While orders are fairly numerous, they have declined in size. Crane and power shovel builders have become somewhat busier and this is reflected in a better demand for steel from that source. Plates are in fair demand from manufacturers of small boilers. A water tank for Elyria will require 400 tons. Structural inquiry is light. With the approach of spring, mills have received releases of quite a few lots of reinforcing bars for Ohio highway bridge work that was placed during the past two or three months. An inquiry is out for 100 tons of billet steel reinforcing bars for an office building for the Telling Belle Vernon Co., Cleveland.

### Sheets

New demand from the automotive industry, which took a spurt when books were opened for the second quarter, has eased off somewhat. Miscellaneous consumers are supplying a good volume of business, largely in enameling sheets for making household equipment. Stove manufacturers are quite busy, and refrigerator manufacturers are maintaining high production schedules. Sheet mills are operating at near capacity to get out orders entered for March shipment and some are comfortably filled for April.

### Strip Steel

New business is coming out in rather moderate volume, but most mills have enough specifications to keep them busy the remainder of the month. Some of the large automobile parts makers have taken about all the strip covered by their last purchases and are not



placing new orders. These plants in some cases evidently have been making parts faster than are needed in automobile production lines and are not keeping up to recent schedules.

#### Rivets

Present prices have been reestablished for the second quarter. These are \$2.90 per 100 lb., Cleveland and Pittsburgh, \$3, Chicago, and \$3.05, Birmingham, for large rivets and 70 and 5 per cent discount for small rivets.

#### Iron Ore

Reestablishment of 1934 prices for the coming season is expected, although present lack of interest by consumers indicates that a buying movement may not develop for several weeks. The same prices have prevailed for five years. The Ford Motor Co., usually the largest open market buyer of ore, as well as the first to send out an inquiry, is expected to purchase a much larger quantity than it did last year, as the Ford company's ore stocks are understood to have been well used up. Recent improvement in blast furnace operations is reflected in good shipments from Lake Erie docks, which amounted to 158,974 tons during February as compared with 70,531 tons during the same month last year. The dock balance March 1 was 4,867,583 tons as against 5,175,886 tons on the same day a year ago.

#### Scrap

There is no new demand from mills and little activity among dealers, as they have about cleaned up shipments against old orders both to Cleveland and Youngstown district mills. Consumers have good stocks, and little new buying is expected before the end of the month. Prices are untested and unchanged.

### Detroit Scrap Prices Unchanged

**DETROIT, March 12.**—The local scrap market is riding along on a fairly even keel, with prices steady and unchanged from a week ago. Consumption and production of old material seem to be in better adjustment, although the Detroit district steel plant is not expected to make fresh purchases for several weeks. The first boatload of scrap destined for Cleveland probably will leave Detroit late this week or early next week, starting what is anticipated to be a large movement of scrap by water this year.



**C**OMPACT, and featuring automatic loading, conveying and oven discharging mechanism, Bartlett-Snow Drum Painting and Handling Equipment records the efficiency of its operation in black ink on the ledgers.

Released from the spray booth, barrels are received on cradles... are carried with only point contact on the chime through the drying and cooling zones—are delivered with up-enders and conveyors to shipping or storage rooms.

Paint ovens and high temperature ovens for lacquer of a design proven in service are available with or without accessory equipment. Write for descriptive literature.

**THE C. O. BARTLETT & SNOW CO.**  
6202 Harvard Avenue Cleveland, Ohio  
In New York—30 Church St. In Chicago—First National Bank Bldg.

- Conveyors
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- Elevators
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- Drum Painting and Handling Equipment
- 
- Dryers
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- Complete Coal and Ash Handling Systems for Boiler Plants
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- Chains, Sprockets, Buckets
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- Mixers
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- Skip Hoists
- 
- Foundry Sand Handling Equipment

## BARTLETT-SNOW

### Paint Booths and Ovens

BARREL WASHERS—DEDENTERS—TESTERS—CONVEYORS—UP-ENDERS

### Boston Scrap Exports Affected by Exchange

**BOSTON, March 12.**—The export scrap situation is rather unsettled because of a hitch in payments for materials shipped abroad. Evidently all exporters have not been doing business on a letter of credit basis, and the hitch in payments is generally ascribed to the recent unsettled condition of the foreign exchange market, especially as it re-

lates to Italy. However, local exporters have just loaded one boat and are loading another. Not much activity is noted in scrap for Pennsylvania delivery. The price structure appears to have steadied, following a further slight downward revision in No. 1 and No. 2 steel.

The pig iron market is practically at a standstill. Furnace representatives, banking on orders from the stove industry, find it operating two or three days a week, with little prospect of reaching full-time output in the near future.

# OUR NEWARK OFFICE AND WAREHOUSE

recently opened at 332 Frelinghuysen Avenue, telephone Bigelow 8-1592, is now stocked with our various grades of HY-TEN and SPECIAL ALLOY STEELS.

## WHEELOCK, LOVEJOY & COMPANY, INC.

CAMBRIDGE

CHICAGO

CLEVELAND

DETROIT

NEWARK

### Fabricated Structural Steel

Lettings Light—New Projects in Good Volume

**A**MONG awards of 6450 tons, the only sizable letting is 1300 tons for a glass plant at Dearborn, Mich., for the Ford Motor Co. New projects of 22,110 tons compare with 16,300 tons last week and 8500 tons two weeks ago. The outstanding new job calls for 10,300 tons for a strip mill for the Great Lakes Steel Corp., Ecorse, Mich. The Fort Peck dam in Montana will require 4317 tons for a spillway gate structure and other work, on which bids will be taken April 3. Plate lettings total 1325 tons, with more than 3100 tons pending. A sewer project in Minneapolis will take 3500 tons of sheet steel piling. Structural steel awards for the week follow:

#### NORTH ATLANTIC STATES

Holyoke, Mass., 130 tons, State bridge over New York, New Haven & Hartford tracks, to Boston Bridge Works, Inc.

Beacon Falls, Conn., 300 tons, State bridge, to American Bridge Co.

Brooklyn, 105 tons, pier shed, to McClintic-Marshall Corp.

Pennsylvania Railroad, 310 tons, steel work for mail handling facilities in New York City, to McClintic-Marshall Corp.

Hamilton, Pa., 265 tons, State highway bridge, to McClintic-Marshall Corp.

Cumberland, Md., 110 tons, German Brewing Co. stockhouse, to Fort Pitt Bridge Works Co.

#### SOUTH AND SOUTHWEST

Sheffield, Ala., 675 tons, gate frames, to Bartlett Hayward Co.

Sheffield, 200 tons, cranes, to Harnischfeger Corp.

Phoenix, Ariz., 820 tons, post office, to McClintic-Marshall Corp.

#### CENTRAL STATES

Cleveland, 100 tons, two post office substations, to Fort Pitt Bridge Works Co.

Cleveland, Ohio, 315 tons, sewage treatment plant, to Fort Pitt Bridge Works Co.

Detroit, 360 tons, Chevrolet Motor Co. gear and axle building addition, to R. C. Mahon Co.

Dearborn, Mich., 1300 tons, glass plant for Ford Motor Co., to McClintic-Marshall Corp.

Cedarburg, Wis., 250 tons, bridge, to Worden-Allen Co.

Perry, Iowa, 320 tons, bridge, to Des Moines Steel Co.

#### WESTERN STATES

Los Angeles, 380 tons, White Memorial Hospital building, to Consolidated Steel Corp.

Calawa, Cal., 120 tons, ice plant for Santa Fe Railroad, to Pacific Coast Steel Corp.

Mare Island, Cal., 150 tons, two locomotive cranes, to Orton Crane & Shovel Co.

Snohomish County, Wash., 227 tons, State bridge over Ebey Slough, to Pacific Car & Foundry Co.; previously reported to an unnamed bidder.

Josephine and Multnomah Counties, Ore., 233 tons, State bridges, to unnamed bidders.

#### NEW STRUCTURAL STEEL PROJECTS

##### NORTH ATLANTIC STATES

New York, 1100 tons, public school No. 43.

Brooklyn, 250 tons, school No. 201.

Utica, N. Y., 200 tons, children's hospital.

Olcott, N. Y., 200 tons, State highway bridge; McLain Construction Co., Buffalo, low bidder.

##### SOUTH AND SOUTHWEST

Cold Creek, Tenn., 350 tons, dam.

Fort Sam Houston, Tex., 475 tons, medical barracks.

State of Texas, 750 tons, bridges.

Jefferson County, Okla., 385 tons, highway bridge.

Beaver County, Okla., 187 tons, highway bridge.

##### CENTRAL STATES

Cleveland, 100 tons, Cuyahoga bridge repair work.

Huron, Ohio, 600 tons, structural work in connection with Wheeling & Lake Erie dock.

Detroit, 10,300 tons, strip mill buildings for Great Lakes Steel Corp.

Evanston, Ill., 150 tons, State highway bridge.

Madison County, Ill., 116 tons, highway bridge; Richardson Construction Co., Decatur, Ill., low bidder on general contract.

Alton, Ill., 6000 tons, dam No. 26 in Mississippi River; bids April 11 by United States Engineer's Office, St. Louis.

Gary, Ind., 175 tons, cranes for American Sheet & Tin Plate Co.

Madison, Wis., 125 tons, bridge.

Chippewa County, Wis., 210 tons, Cadott-Cornell bridge; bids March 26.

State of Iowa, 500 tons, bridges.

Floodwood, Minn., 175 tons, bridge.

Harrison County, Mo., 112 tons, highway bridge.

Martin County, Kan., 230 tons, highway bridge; Geiger & Rutherford, Wichita, Kan., low bidders on general contract.

#### WESTERN STATES

Warm Springs, Mont., 100 tons, school.

Fort Peck, Mont., 4317 tons, spillway gate structure, cut-off structure and appurtenant works, Specification No. 35-225; bids April 3.

Fresno, Cal., 400 tons, city auditorium; bids rejected and plans will be revised.

San Diego, Cal., 700 tons, assembly plant for Ford Motor Co.

Los Angeles, 500 tons, cracking plant for Wilshire Petroleum Co.

#### FABRICATED PLATE

##### AWARDS

Northboro, Mass., 100 tons, standpipe, to Chicago Bridge & Iron Works.

Sewaren, N. J., 610 tons, three tanks for Royal Petroleum Co., to Chicago Bridge & Iron Works.

Poughkeepsie, N. Y., 265 tons, standpipes, to Pittsburgh-Des Moines Steel Co.

Fort Peck, Mont., 350 tons, dredge pipe, to McClintic-Marshall Corp.

#### NEW PROJECTS

Elyria, Ohio, 400 tons, 1,000,000-gal. tank in connection with waterworks extension.

Marion, Wis., 200 tons, water tank and tower; Pittsburgh-Des Moines Steel Co., low bidder.

Long Beach, Cal., six tanks, 2,500,000 gal. combined capacity; bids soon.

Los Angeles, 500 tons, cracking plant for Wilshire Petroleum Co.

Los Angeles, four tanks for Petro Corp., 85,000 bbl. combined capacity; bids soon.

Ventura, Cal., 125 tons, 18-in. welded steel pipe; bids taken March 11.

Tacoma, Wash., 1900 tons, third unit of Green River pipe line; date for bids to be announced about April 1.

#### SHEET PILING

##### NEW PROJECTS

Alton, Ill., 230,000 sq. ft. for dam No. 26 in Mississippi River; bids April 11 by United States Engineer's Office, St. Louis.

Minneapolis, 3500 tons, for sewer projects.

Denver, 350 tons, for Rye Patch dam in Nevada; bids taken March 11.

## Plain Jolt Machine Overlooked in Jobbing Foundry Practice

(CONCLUDED FROM PAGE 13)

diverted from the floor to the larger unit, the crusher base casting shown at Fig. 7, approximating 3200 lb. weight, exemplifies what is possible with slight pattern alterations and partial employment of the machine when its complete use is not advisable. In the end view of the closed mold, at Fig. 8, the main core forming the interior of the casting is shown suspended from the cope by hook bolts and fishplate arrangement, chaplets being thereby eliminated.

The pattern as originally made, left an irregularly shaped mold, the handhole cores being fastened into prints on the outside wall of the mold as shown at the left of the sketch. In order to make the job suitable for the machine, the coreprints were removed, leaving a straight outside face. A small alteration to the main corebox made the accommodation of the handhole cores in prints provided in the main core a simple matter, as shown at the right: These changes permitted the mold to be jolted for four-fifths of its depth, the last few courses, after the inlet gate cores were set, being completed by hand, to avoid misplacing or breakage of the gate core arrangement. The saving per mold by this method worked out at five hours time for both molder and helper.

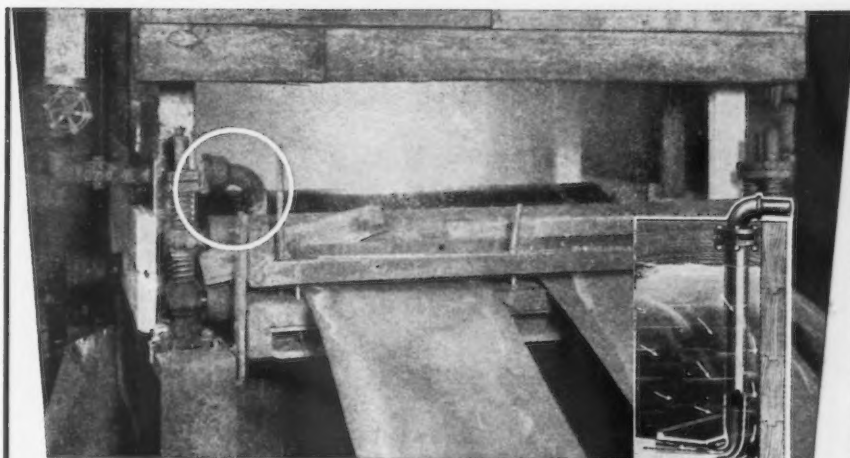
## Lubrication Guidance Helps to Hold Customers

(CONTINUED FROM PAGE 29)

turn rancid in time, setting up an acidic reaction due to their organic content. The numerical valuation given in our specification neutralization number requires that this be held to a minimum, i.e., 0.10 maximum.

"A properly refined oil suitable for sewing machine lubrication will not have a carbon residue in excess of our specifications.

"The acid test determines the



In the continuous pickler of the Thomas Steel Co., Warren, Ohio. The bell-end jet shown in the circle has been replaced by the split-flanged jet shown at the lower right.

## Down where the going is tough — that's where you find DURIRON

Where the acid is active, hot, vicious—where the moving sheet of steel is quickly pickled, cleaned, for the next operation in the mill. And the Duriron stays right there, for a long time, taking it on the chin—and liking it.

The Duriron steam jet shoots in the steam to keep the pickle liquor at the right temperature for best results. The steam tries to wire-draw it, tear at it, rip it out, but has to give up. The Duriron jet sits snugly in the corner of the pickler, forcing the steam into circulating, heating, agitating the liquor so that finishing costs will be reduced.

Duriron Steam Jets will do that much for you if you'll give them the chance—and save you money in doing it. Are you interested? For bulletins, just write

**THE DURIRON COMPANY, Inc.**  
438 N. Findlay St. Dayton, Ohio

presence of free or uncombined hydrocarbons which oxidize and produce a stain when exposed to air or sunlight. Only a water white oil complying with our Specification 86 will be found to be refined and purified to a point where these hydrocarbons are eliminated.

"It is our recommendation that our customers buy their sewing machine lubricating oil on the sellers' guarantee that it complies with one or other of the specifications and not solely on its brand or trade name which we may have tested and recommended."

The company also makes recommendations as follows with regard to the lubrication of its products:

(a) Any machine operated intermittently can be lubricated with a straight mineral oil of S.A.E. No. 10 viscosity, Union Special Specification No. 83.

(b) Any machine used on long or continuous runs should be lubricated with a compounded oil, Specification No. 82. These oils possess greater adhesive qualities and are much more difficult to shake off of revolving eccentrics, etc. They are also made soluble by the fact that they possess this compounding and, therefore, if by accident articles are stained by them, such stains can be removed by washing.

(c) Compounded oils, irrespec-



# STRONG STEEL CASTINGS



## Strong Steel Foundry Co.

Buffalo, New York

tive of manufacturer, will filter out with time. Therefore, the complete lubrication system of any machine using them should be cleaned out at least twice a year with some solvent such as gasoline, kerosene, benzene, eosene, or carbon tetrachloride.

(d) Water white mineral oils, Specification No. 86, should be used wherever prevention of oil stain is of utmost importance, and where sewed article must not be washed after the sewing operation.

The above is the experience and practice of a manufacturer making quality and precision products. Lubrication has and is playing an important role, not only in quality production but also in the maintenance of satisfied and repeat customers. The problems involved have broad and important application throughout the metalworking industry.

## Brittleness in Steel

(CONCLUDED FROM PAGE 25)

it only indicates that the material is failing by means of its consecutive layers. In quenched material, the conditions are more ideal, as the metal fails all at once and ductility does not precede rupture.

This also is true in thin hollow specimens, as the load cannot be transferred from one metal layer to another. The correct means of determining the true ductility of the material is not by taking the final breaking angle but the angle obtained from the point at which final rupture occurs. This is similar to tensile testing where the breaking load is always smaller than the ultimate strength, with the exception of quenched material where the two are the same. Therefore, in torsional testing, as in tensile testing, there should be two breaking angles or two forms of ductility, namely: (1) ductility where failure begins, and (2) ductility where failure occurs. The former should always be less than the latter except in the case of quenched and hollow test specimens where the two are identical.

The breaking weight (lb.) given in the tables of this dissertation can be easily converted into torsional yield point and torsional strength (torsional modulus). Since the diameter of the bar is known (reduced section) and the torque (breaking weight) the yield point and torsional strength can be calculated from the following formulae, where  $q$  = stress,  $d$  = diameter, and  $T$  = torque (weight).<sup>26</sup>

<sup>26</sup> M. Fetzner, Doctorate's Thesis, Harvard University, 1934.

$$\text{Yield Point} = qm = \frac{16T}{\pi d^3}$$

$$\text{Torsional Strength} = q = \frac{12T}{\pi d^3}$$

## German Barter Trade Still Flourishing

HAMBURG, March 1. (By Special Correspondence).—The German steel industry does not regard the Japanese industry as a serious menace in the export market, although it is generally admitted that Japanese competition may still gain force during the next years. Japan is dependent upon supplies of foreign raw materials, making its position rather difficult.

The Japanese industry was greatly assisted by the decline of the American dollar, as Japan is ordinarily forced to import heavy quantities of scrap, and, without the devaluation of the dollar, gold prices would have to be paid for this material.

Development of barter trading is continuing, and the German industry has booked numerous contracts. Most of the large companies' trading organizations have now been reorganized for barter purposes in cooperation with Dutch and British merchants.

The question of future German export allotments has not yet been settled. With the return of the Saar to Germany, the former's allotments will be united with the German total, but the German steel industry is demanding a 12 to 15 per cent increase in its export quotas. Rumors are again circulating that Germany will leave the cartel, but these reports are believed to be baseless. The International Tube Cartel, which expires at the end of March, will be extended, and all members have already agreed.

German shipyards are prospering. Unfilled orders on their books in January totaled 224,040 tons, compared with 81,993 tons in Jan., 1934, and 72,380 tons in Jan., 1933. Germany is thus again the second country in world shipbuilding. Of the total orders in 1933, only 20 per cent were for foreign owners, 32 per cent came from abroad in 1934, but nearly 50 per cent in 1935. New orders are still increasing, but most of the ships built for foreign owners are on a barter basis.

## Industrial Finance

Mesta Machine Co. had 1934 net earnings, after all charges and taxes, of \$1,517,249, an increase of 140 per cent over net earnings in 1933. Earnings in 1934, after payment of dividends on preferred stock now retired, were equivalent to \$1.47 a share of common stock outstanding. Uncompleted business carried over into 1935 totaled \$2,347,006, compared with \$1,799,509 carried over into 1934.

Lamson & Sessions Co., Cleveland, had net loss from operations in 1934 after depreciation, of \$129,060. The company made a small profit in 1933. George S. Case, president, in a report to the stockholders said that with little increase in business last year the company paid out 35 per cent more for labor and 25 per cent more for material and the average production costs increased 21 per cent, due largely to the NRA.

Marion Steam Shovel Co., Marion, Ohio, had net loss in 1934 of \$215,287 after deducting all charges, including depreciation and providing obsolescent reserves. This compares with a loss of \$570,563 in 1933.

American Steel Foundries, Chicago, had net profit in 1934 of \$245,365. Surplus stood at \$4,309,307, as of Dec. 31.

National Lead Co. had net profits in 1934 of \$4,200,188, after taxes, depreciation, depletion and other charges. This is equivalent, after dividend requirements on the preferred stock, to \$8.37 a share on 271,500 shares of common stock outstanding at the close of the year and \$7.34 a share on 309,331 shares outstanding after payment of stock dividend on Jan. 15, 1935. In 1933 the net profit was \$3,828,329, or \$6.98 a share on 271,467 average common shares.

Bohn Aluminum & Brass Corp. had net profits in 1934 after interest, depreciation, Federal taxes and other charges of \$1,518,387, equal to \$4.31 a share on 352,418 \$5 par capital shares, against \$1,494,552, or \$4.24 a share in 1933. Quarter ended Dec. 31: Net profit was \$254,932, or 73c. a share, against \$335,323, or 95c. a share, in corresponding quarter of 1933.

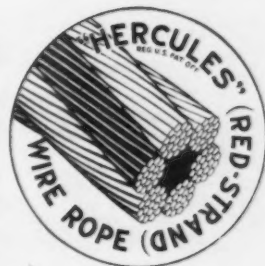
Bridgeport Machine Co. had net income in 1934, after depreciation, depletion, interest, Federal taxes and other charges of \$221,907, equal after annual dividend requirements on 5,139 shares of 7 per cent cumulative preferred stock on which there is an accumulation of unpaid dividends, to \$1.24 a share on 150,000 no par common shares. This compares with \$50,414, or 9c. a share, on common stock in 1933.

Midland Steel Products Co. and subsidiary in 1934 had net profit after depreciation, Federal taxes and other charges, of \$680,656, equal to \$7.17 a share on 94,925 shares of \$100 par 8 per cent cumulative first preferred stock, excluding 2005 shares in treasury. This compares with \$672,728, or \$7.09 a share on first preferred stock, in 1933.

National Acme Co. in 1934 had net profit after interest, depreciation, amorti-

## Results Are What Count

If you want real economy—look to results rather than to first cost. It is on this basis that "HERCULES" (Red-Strand) Wire Rope continues to make and hold friends. There are reasons, of course, why this wire rope is so dependable and long lasting, and we are always glad to give full details to everyone interested in saving money. Made in a wide range of constructions including Round Strand, Flattened Strand, Preformed, Non-Rotating and Steel Clad types.



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zation, taxes and other charges of \$140,329, equal to 28c. a share on 500,000 \$1 par shares, contrasted with net loss of \$311,056 in 1933.

McKeesport Tin Plate Co. and Tin Plate Improvement Co., McKeesport, Pa., had net profit in 1934 of \$1,859,339, including profit of \$828,081 from Metal Package Corp., equal to \$6.19 a share, compared with net profit of \$1,888,416, including profit of \$638,153 from Metal Package Corp., or \$6.29 a share, in 1933.

The Rustless Iron & Steel Corp., Baltimore, and subsidiary, Rustless Iron Corp., in the year ended Dec. 31, 1934, had gross sales profit of \$217,980. After deducting selling expenses, administrative and general charges, research, development and patent expense and interest charges, net loss was \$23,034.

Harbison-Walker Refractories Co., Pittsburgh, in the year ended Dec. 31, 1934, had net income of \$1,247,461.

Wheeling Steel Corp. has declared dividend of 50c. a share on 6 per cent cumulative preferred stock, payable April 1, to stockholders of record on March 12.

Blaw-Knox Co. and subsidiaries had net profit for 1934 of \$35,504 after deduction of interest, depreciation and provision for Federal taxes. The profit is equivalent to 3c. a share on stock outstanding, and compares with net earnings for the previous year of \$111,666, after all charges and tax, or 8c. a share.

Net sales of the Black & Decker Mfg. Co., Towson, Md., and subsidiaries for the year ended Sept. 30, totaled \$2,781,339, netting a profit after allowance for all charges and Federal taxes of \$325,533. Business during the December quarter of the new fiscal year showed a gratifying increase over the same period one year ago.

## New Trade Publications

**Valves.**—Homestead Valve Mfg. Co., Coraopolis, Pa. Reference book No. 37, 46 pages, describing and illustrating complete line of valves including protected seat hydraulic operating valve and protected seat spray valve used in control of high pressure hydraulic spray systems for descaling steel. Vapor spray cleaning machine, hypressure Jenny is also described. Full dimensions and prices on all standard products are clearly outlined.

**Journal Jacks.**—Duff-Norton Mfg. Co., Pittsburgh. Bulletin No. 516 illustrating and describing new journal jacks. Capacity tables and prices. Size 8½ by 11 in., 4 pages.

**Chucks.**—Cushman Chuck Co., Hartford, Conn. Bulletin No. 1-20C, 16 pages, descriptive of a new Cushman power chuck with rotary power unit. Also bulletin No. 1-27, 12 pages, covering features of Cushman straight line power unit, motor operated.

**Nails.**—The Angell Nail & Chaplet Co., 4580 East Seventy-first Street, Cleveland. Brochure, analyzing and picturing nail construction, use and serviceability.

**Heat Treating.**—Kropp Forge Co., 5301 West Roosevelt Road, Chicago. Bulletin. Describes the equipment and processing used by this company in the heat treating of both large and small forgings which are produced in its production shops.

**Safety Appliances.**—Mine Safety Appliances Co., Pittsburgh, Pa. Interesting booklet deals with carbon monoxide poisoning in industry and methods of combatting the hazard. Detection, warning and respiratory equipment are described and illustrated.





## Plant Expansion and Equipment Buying

### Press Buying Features Machine Tool Trade—Industrial Orders Lead

THE buying of large presses for the stamping of sheet steel has been the feature of the machine tool market during the past week. One large steel company is reported to have spent as much as \$200,000 for this purpose to equip the plant of a subsidiary. Demand for presses has been good for several months, as the automobile industry has been calling for larger and larger units principally for the construction of turret tops.

The Westinghouse Electric & Mfg. Co., East Pittsburgh, has purchased a number of tools for its principal works and will likely buy equipment for the rehabilitation of some of its other plants. Demand for machinery and equipment from other industrial users is improving and the steel industry is expected to become a more and more important customer as the year goes on.

#### ◀ NORTH ATLANTIC ▶

**Continental Can Co.**, 1 Pershing Square, New York, has engaged Battey & Kipp, Inc., 231 South La Salle Street, Chicago, consulting engineer, to prepare plans for new plant at Elwood, Inc., where 8-acre tract recently was acquired. Cost close to \$400,000 with equipment. Company has just purchased plant and business of Columbia Can Co., St. Louis, manufacturer of tin cans, boxes, etc., and will operate as a subsidiary. Factory of Janssen-Ostertag Mfg. Co., Kansas City, Mo., manufacturer of similar tin and metal containers, was also lately acquired, and will be continued as a branch plant.

**Rich & McLean, Inc.**, 60 Cliff Street, New York, manufacturer of type-setting machinery and supplies, has purchased six-story building at 65-69 Frankfort Street, totaling about 14,000 sq. ft. ground area, and will occupy large part of structure for new plant.

**Board of Education**, Park Avenue and Fifty-ninth Street, New York, plans manual training department in new multi-story high school at Totenville, S. I., for which general contract is being let to Paaty & Fuhrman, Inc., 369 Lexington Avenue, New York. Fund of \$976,000 has been arranged for building and equipment. W. C. Martin, Flatbush Avenue Extension and Concord Street, Brooklyn, is architect and superintendent for board.

**Bureau of Supplies and Accounts**, Navy Department, Washington, asks bids until March 26 for eight ventilating sets and spare parts for Brooklyn, Philadelphia, Mare Island and Puget Sound navy yards (Schedule 4492).

**General Aniline Works, Inc.**, 1150 Broadway, New York, will take new bids this month for five-story addition, 30 x 82 ft., to plant at Rensselaer, N. Y. Cost about \$85,000 with equipment.

**Signal Supply Officer**, Army Base, Brooklyn, asks bids until March 25 for one 5-kva. power unit (Circular 90).

**Hindale Structural Steel Corp.**, Brooklyn, has been organized by Bernard Cohen, 160-16 Jamaica Avenue, Jamaica, L. I., and Albert Krull, same address, to operate a structural iron works, machine shop and foundry.

**American Display Corp.**, 475 Tenth Avenue, New York, manufacturer of advertising displays, signs, etc., has leased space in building at 521-31 West Fifty-seventh Street, totaling about 30,000 sq. ft. floor space, for new plant.

**Dover Tank & Stack Co., Inc.**, Dover, N. J., recently organized, has leased former plant of International High Speed Steel Co., near city, for manufacture of tanks, stacks, flues and other steel products. New company is headed by Walter E. Goldsworthy, for many years an official of Dover Boiler Works, Dover, who will be president and secretary. Dominick M. Esposito, proprietor of Dover Electric Welding Works, Lee Avenue, will be treasurer and plant manager. Last noted plant will continue in operation as a separate enterprise. Main office of new company will be located at Lee Avenue address noted.

**Verplex Co.**, Bound Brook, N. J., Julius Lippincott, vice-president, manufacturer of lamp shades and kindred products, is considering rebuilding plant recently damaged by fire. Loss about \$50,000 with equipment.

**Bureau of Yards and Docks**, Navy Department, Washington, asks bids until March 27 for one 10-ton electric bridge crane and four 2-ton electric mono-rail hoists for naval aircraft factory, Philadelphia (Specification 7892).

**Pennsylvania Railroad Co.**, 15 North Thirty-second Street, Philadelphia, C. J. Lemneck, purchasing agent, asks bids until March 19 for steel tires, tool and high-speed steel (Contract 2-1935), wheels and axles, piston heads, track spikes, tie plates, joint bars, floor plates, etc. (Contract 4-1935).

**Bureau of Supplies and Accounts**, Navy Department, Washington, asks bids until March 19 for one motor-driven vertical tapping machine (Schedule 4478), one motor-driven horizontal boring, drilling and milling machine (Schedule 4480), one motor-driven metal-cutting machine (Schedule 4479); until March 22, 34 airplane wheels and two wire landing-gear wheels (Schedule 900-8220) for Philadelphia Navy Yard; until March 26, corrosion-resisting steel casings for uptakes for boilers (Schedule 4499) for Philadelphia, Norfolk and Mare Island yards.

**Commanding Officer**, Frankford Arsenal, Philadelphia, asks bids until March 20 for one paint-baking oven for building No. 39 (Circular 305).

#### ◀ NEW ENGLAND ▶

**Milford Rivet & Machine Co.**, Post Road, Milford, Conn., has let general contract to John L. Simpson, 41 Putnam Street, Bridgeport, Conn., for one-story addition, 38 x 60 ft. O. N. Rasmussen, Milford, is architect.

**School Board**, Chicopee, Mass., J. J. Desmond, Jr., superintendent, plans manual training department in new two-story junior high school. Cost about \$260,000. Henry J. Tessier, 220 Dwight Street, Springfield, Mass., is architect.

**Woodsum Stoker Co., Inc.**, Braintree, Mass., has been organized by Wilford F. Woodsum, 38 Crescent Avenue, and associates, to manufacture stokers, oil burners and kindred equipment.

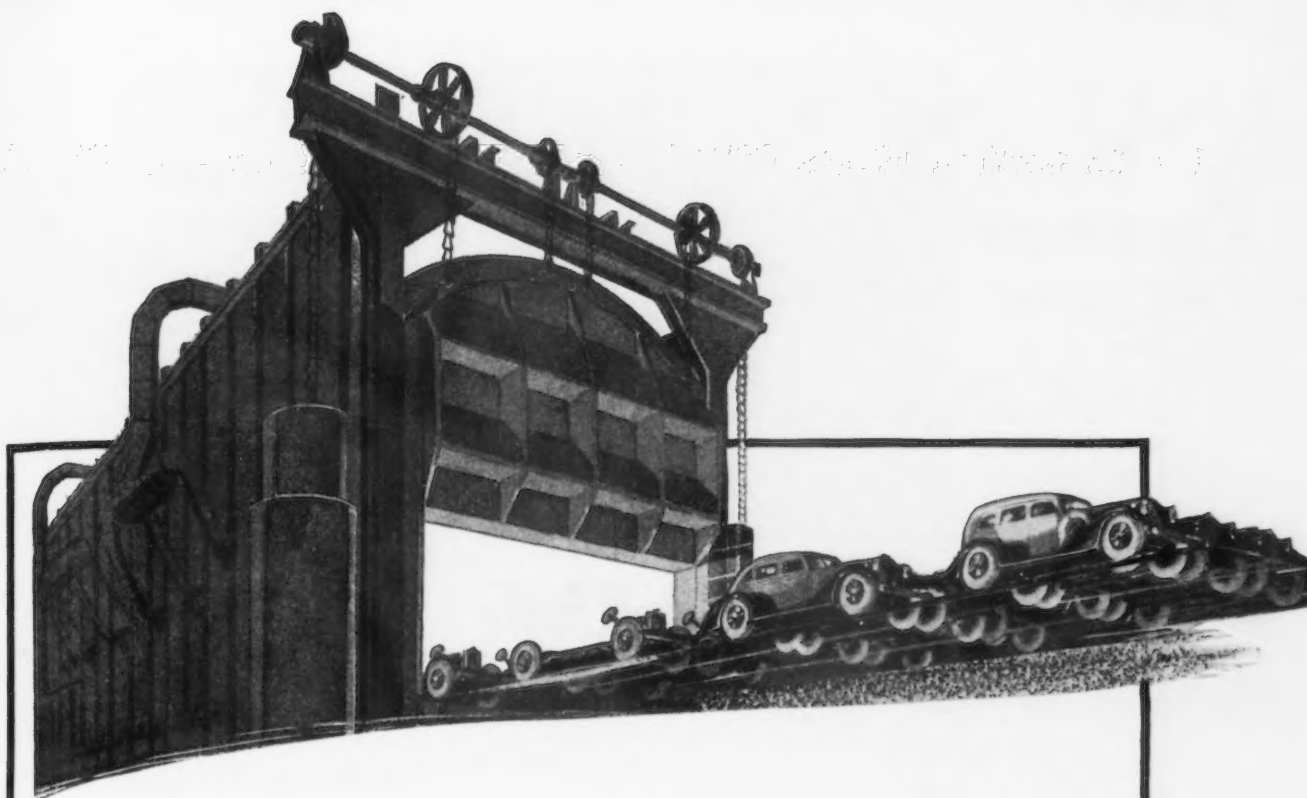
**American Wire Works**, 31 Kilbourn Street, Hartford, Conn., has removed to building at 300 Church Street, where increased plant facilities will be provided.

#### ◀ SOUTHWEST ▶

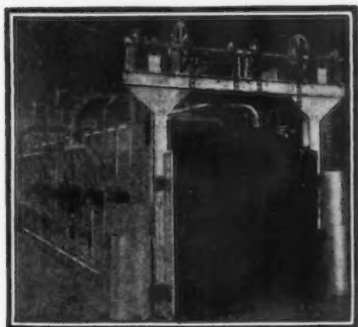
**Board of Education**, Library Building, Kansas City, Mo., George Tinker, secretary, has authorized manual training department in two-story addition to J. C. Nichols school. Cost about \$70,000. Charles A. Smith and Nate W. Downes, both Finance Building, are architect and mechanical engineer respectively.

**Oklahoma Gas & Electric Co.**, Oklahoma City, Okla., has authorized fund of \$755,700 for extensions and improvements in plants and system, including new





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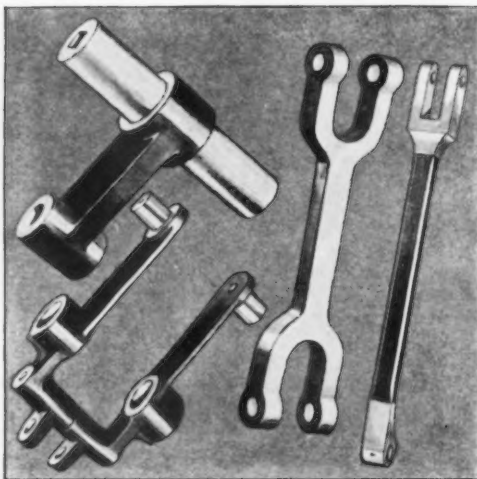
Though obscure, the picture of MAHR furnaces behind the construction of the modern automobile is very real. MAHR furnaces carburize the piston pins, heat the steel for forming the springs and bumpers, bake the cores for the cylinder blocks, heat the steel for forging the crank shafts, heat treat the alloy axle, and perform numerous other vital functions.

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equipment, additions in electric transmission lines, pipe lines for gas distribution, etc.

**Board of Public Service, City Hall, St. Louis,** has plans for one-story addition, 42 x 100 ft., to United States Naval Reserve hangar at municipal airport, including repair and reconditioning facilities. Albert Oxburg and William C. E. Becker, both City Hall, are architect and engineer respectively.

**Arkansas Power & Light Co., Pine Bluff, Ark.,** has approved plans for new electric transmission and distribution lines in Ozark district, about 100 miles, as part of rural electrification project, including new line from Harrison to Western Grove,

Jasper and other points. Cost over \$200,000 with substations and other operating facilities. L. G. Cooper is manager of Ozark division.

**City Council, Trenton, Mo.,** has secured fund of \$315,000 to build new municipal electric light and power plant, with installation of Diesel engine-generator units and accessory equipment. Burns & McDonnell Engineering Co., 107 West Linwood Boulevard, Kansas City, Mo., is consulting engineer.

**United States Engineer Office, Galveston, Tex.,** asks bids until March 18 for electrical equipment and supplies (Circular 177).

**Parrish Tool Corp., Dallas, Tex.,** has been organized by D. S. Parrish, Dallas, and associates, to manufacture tools and other mechanical equipment.

### ◀ BUFFALO DISTRICT ▶

**Snider Packing Corp., 14 Franklin Street, Rochester, N. Y.,** plans addition to food products packing plant at Mount Morris, N. Y., including mechanical freezing unit. Cost over \$100,000 with machinery.

**Central School Board, Truxton, N. Y.,** plans manual training department in new central high and grade school, for which general contract has been let to Saucke Brothers Construction Co., 82 Saranac Street, Rochester, N. Y. Cost about \$125,000. C. W. Clark, Cortland, N. Y., is architect.

**John Labatt, Ltd., London, Ont.,** has plans for multi-story addition to brewery. Cost close to \$100,000 with machinery. Watts & Blackwell, Ltd., London, is architect and engineer.

**McCallum-Hatch Bronze Co., Inc., Buffalo,** has acquired business of William H. Barr, Inc., manufacturer of brass, bronze, copper and aluminum castings. General offices will be continued at 27 Carolina Street, and foundry at 242 Fourth Street, Buffalo. John C. McCallum is president and treasurer, James A. Hatch, vice-president and sales manager, and William F. Hagedorn, secretary.

### ◀ SOUTH ATLANTIC ▶

**Brockwell Operating Co., Durham, N. C., S. B. Brockwell, president,** has approved plans for new bulk oil storage and distributing plant on 3-acre tract, fronting on Cape Fear River, Wilmington, N. C., recently acquired. It will consist of several units, with main one-story building, 100 x 200 ft. Cost close to \$60,000 with equipment.

**Town Council, Burgaw, N. C.,** asks bids until March 21 for pumping machinery and accessories, chlorinator and equipment, 75,000-gal. or 150,000-gal. (alternate bids) galvanized steel tank on 751-ft. steel tower, pipe lines, etc., for municipal waterworks. J. B. McCrary Co., Atlanta, Ga., is consulting engineer.

**Board of Education, Henderson, N. C.,** plans manual training department in new multi-story high school for which bids are being asked on general contract. Cost about \$125,000. Eric G. Flannigan, Henderson, is architect.

**City Council, Tampa, Fla.,** plans extensions and improvements in municipal waterworks, including new pumping stations, trunk and distribution lines, high pressure pipe line system, alum manufacturing plant for water purification and other structures. Cost over \$1,000,000 with equipment. Board of Works will be in charge.

### ◀ WESTERN PA. DIST. ▶

**American Cyanamid & Chemical Co., Bridgeville, Pa.,** has approved plans for one-story addition, 80 x 95 ft. Cost close to \$30,000 with equipment.

**Sun Oil Co., 1608 Walnut Street, Philadelphia,** has let general contract to Dawson-Evans Construction Co., Cincinnati, for new bulk oil storage and distributing plant at Kenova, W. Va. Cost over \$40,000 with tanks and equipment.

**Water Department, Titusville, Pa.,** is planning electrification of pumping plant for municipal water supply, with new equipment to replace present steam-driven machinery. City engineer is in charge.

### ◀ OHIO AND INDIANA ▶

**Toledo Bottle Cap Co., 1345 Miami Street, Toledo, Ohio,** has let general contract to George W. Lathrop & Sons, Inc., 1220 Madison Avenue, for one-story addition, 45 x 160 ft. Cost over \$40,000 with equipment. Mills, Rhines, Bellman &

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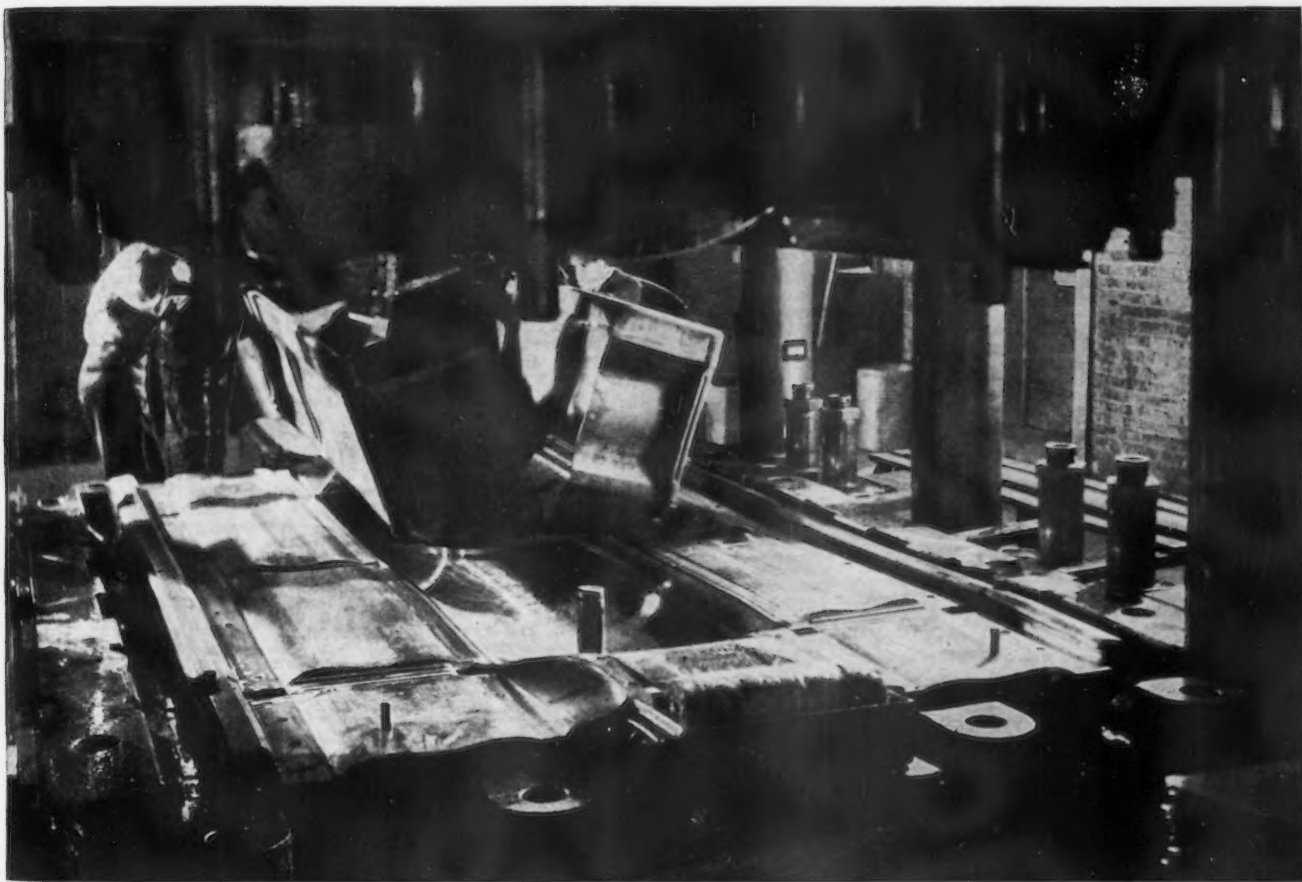
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 Hot-Rolled Sheets ★ Long Ternes ★ Hot-Rolled Strip ★ Tin Mill Black Plate



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**WICKWIRE** Spencer Perforated Metals are the result of study and research in both general requirements and specific applications where unusual treatment is needed in any degree. Pattern, size of holes, kind and thickness of metal are all considered in relation to the work to be done—all these assuring the maximum service life. Consult Wickwire Spencer engineers—it will cost you nothing and may save you much in avoiding unnecessary replacements.



Wickwire Spencer Steel Company, 41 East 42nd Street, New York City; Buffalo, Chicago, Worcester; *Pacific Coast Headquarters*: San Francisco; *Warehouses*: Los Angeles, Portland, Seattle. *Export Sales Department*: New York City.

## WICKWIRE SPENCER PERFORATED METALS

Nordhoff, Inc., Ohio Bank Building, is architect.

United States Engineer Office, Zanesville, Ohio, asks bids until March 19 for new Mohawk dam near Warsaw, Ohio, for Muskingum Watershed Conservancy District, including electric traveling crane and hoist, light and power system, steel operating gates and other equipment; until April 2 for similar dam for same District near Senecaville, Ohio (Circular 67).

Youngstown Metal Products Co., Inc., Youngstown, Ohio, has been organized by officials of Youngstown Sheet & Tube Co., Youngstown, to manufacture sheet metal products. Company will remodel existing plant for new works, to be ready for service late in spring.

John M. Hirst Cooperative Coal Co., Salineville, Ohio, plans new tippie at coal-mining properties, to replace unit recently destroyed by fire. Walter Holt is general manager.

Material Division, Air Corps, Wright Field, Dayton, Ohio, asks bids until March 18 for 1000 flexible gun sight assemblies, 1000 fixed gun sight assemblies and 500 long range sight assemblies (Circular 541); until March 19, bipost sockets and accessories (Circular 555); until March 20, 7680 lb. galvanized steel wire, 1700 lb. cold drawn steel wire, and 3380 lb. carbon steel spring wire (Circular 539); time deflection recorder (Circular 540); until March 22, brass welding rods and iron welding rods (Circular 548), shielding ignition switch covers, 1000 box and mounting assemblies, and 2000 generator terminal housing assemblies (Circular 545); until March 25, chrome molybdenum seamless steel tubing, and chrome nickel corrosion-resisting steel tubing (Circular 538), bomb release handle assemblies (Schedule 552), gun charging control assemblies, gun sight assemblies, motor assemblies, trigger motor mounting bolts, trigger motor mounting nut assemblies, trigger motor adjusting screws, gun sight mount assemblies, etc. (Circular 546).

Board of Public Works, City Hall, Richmond, Ind., asks bids until March 18 for new municipal sewage disposal plant, including five motor-driven sludge pumps and accessories, motor-driven and gas-driven air blowers, boiler, overhead conveyor ash-handling system, settling tanks, screening equipment, grinding machinery, gas-burning and control equipment, etc. Charles Hurd, Architects Building, Indian-

apolis, is consulting engineer. Fund of \$500,000 has been arranged for project.

Board of Trustees, Indiana School for Boys, Plainfield, Ind., plans new one-story industrial building at institution, for which bids are being asked on general contract. Cost about \$25,000 with equipment. O. B. Little, Meridian Life Building, Indianapolis, is architect.

### ◀ SOUTH CENTRAL ▶

Standard Oil Co., Inc., in Kentucky, 430 West Bloom Street, Louisville, has plans for new bulk oil storage and distributing terminal on 10-acre tract of waterfront property at Panama City, Fla., including pumping station, steel tanks and other facilities. Cost about \$75,000 with equipment.

Louisville Gas & Electric Co., 311 West Chestnut Street, Louisville, has arranged appropriation of \$507,000 for extensions and improvements in plants and system, including reconstruction of 66-volt transmission line, cost about \$50,000; new substation and removal of present station on Campbell Street to new location, \$85,000; extensions in transmission and electrical distribution lines, etc. A. W. Lee is vice-president in charge of operation.

New Orleans Corrugated Box Co., Conti and Dorgenois Streets, New Orleans, La., has let general contract to H. J. Cowgill Co., Bogalusa, La., for one-story addition to factory branch, storage and distributing plant at Bogalusa, 80 x 200 ft. Cost over \$45,000 with equipment.

Ouachita Parish Gravity and Drainage District No. 1, West Monroe, La., will soon take bids for two main pumping units and auxiliary equipment for new pumping plant of 10,000,000 gal. per hr. rating. Fund of \$47,000 has been arranged. C. A. Peerman is engineer.

Lawrence County Board of Education, Town Creek, Ala., has asked bids on general contract for new one-story County vocational school. Cost over \$40,000 with tools and equipment. Nathaniel Almon is secretary of board.

Board of Trustees, Tennessee Polytechnic Institute, Cookeville, Tenn., is considering rebuilding brass and bronze foundry at institution, recently destroyed by fire. Loss about \$30,000 with equipment.

### ◀ MICHIGAN DISTRICT ▶

Mueller Brass Co., Riggin Street, Port Huron, Mich., manufacturer of valves and other brass and copper specialties, plans two or more one-story additions, including equipment. Cost over \$100,000 with machinery. Company is affiliated with Electric Auto-Lite Co., Toledo, Ohio.

C. & K. Brewery, Hamtramck, Mich., has let general contract to Brown Construction Co., Hammond Building, Detroit, for multi-story addition for brew-house. Cost over \$50,000 with machinery. S. J. Stachowiak, 11334 McDougall Street, Detroit, is architect.

United States Engineer Office, Detroit, asks bids until March 21 for one gasoline marine engine (Circular 7).

Acme Die-Casting Co., 11831 Charlevoix Street, Detroit, has been organized by Daniel D. J. Jend, 1127 Berkshire Road, Grosse Pointe, Detroit, and associates, to manufacture die-castings and kindred products.

Commercial Mining Co., Union Produce Terminal, Detroit, plans expansion at coal-mining properties near Saginaw, Mich., including new surface machinery, elevating and conveying, loading and other equipment. Company is arranging fund of \$50,000 for project. William Langley is mine superintendent.

### ◀ MIDDLE WEST ▶

Wander Co., 180 North Michigan Avenue, Chicago, manufacturer of malt products, has let general contract to Dahl-Stedman Co., 11 South La Salle Street, for three-story addition to plant at Villa Park, Ill. Cost over \$165,000 with equipment. Richard Griesser & Son, 64 West Randolph Street, are architects.

Reliance Elevator Co., 212 West Austin Avenue, Chicago, manufacturer of freight elevators, parts, etc., with main plant at St. Joseph, Mich., has leased two-story building at Adams and Loomis Streets, for new factory branch, storage and distributing plant.

John A. Kern, Inc., Chicago, has been organized by John A. Kern, 224 North Sheldon Street, and associates, to manufacture dies, tools, metal stampings and kindred products. New organization will take over business heretofore operated in name of John A. Kern, address noted, and carry out expansion.

Town Council, Lamoni, Iowa, asks bids until March 26 for Diesel engine-generator units and accessories, switchboard, fuel oil tank and system, etc., for new municipal electric light and power plant. Fund of \$100,000 has been arranged. Young & Stanley, Inc., Muscatine, Iowa, is consulting engineer.

Brown Steel Tank Co., Minneapolis, Minn., has been organized by Arthur E. A. M., and Walter V. Brown, 5256 Beard Avenue, to manufacture steel tanks, stacks and kindred steel products.

Board of Water Commissioners, Red Wing, Minn., asks bids until March 20 for motor-driven deep-well pumping machinery and accessories for municipal waterworks. S. T. Irvine is city clerk.

Minnesota Mining & Mfg. Co., 791 Forest Street, St. Paul, manufacturer of abrasive paper goods, roofing products, etc., has purchased plants of Funkhouser Co. and Columbia Silica Co., Akron, Ohio, manufacturers of granule roofing specialties, including about 50 acres of mineral lands and quarries for raw material supply. New owner plans development of properties, including crushing and manufacturing units.

### ◀ WASHINGTON DIST. ▶

Federal Tin Co., Inc., 11 East Barre Street, Baltimore, manufacturer of tin cans and containers, has leased six-story building at 6-10 East Lee Street and will remodel for new plant, expanding present capacity. Cost over \$40,000.

Purchasing and Contracting Officer, Holabird Quartermaster Depot, Baltimore, asks bids until April 5 for bolts and nuts, stove bolts, cotter pins, lock washers, steel



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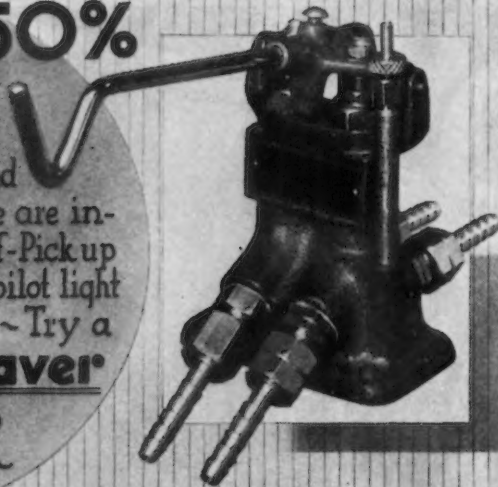




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washers, hacksaw blades, etc. (Circular 117).

**General Purchasing Officer**, Panama Canal, Washington, asks bids until March 21 for twist drills, die-stocks, bolt dies, cap screws, steel set screws, two portable exhaust ventilating fans, motor-starting switches, knife switches and other equipment (Schedule 3038).

**Williamsport Wire Rope Co.**, Williamsport, Pa., has leased plant of Beth Mary Wire Rope Works of Bethlehem Steel Co., Sparrows Point, Baltimore, for branch plant, with option to purchase later.

**Procurement Officer**, Chemical Warfare Service, Edgewood Arsenal, Md., asks bids until March 20 for one compressor and one dryer (Circular 105).

**Maryland Distillery, Inc.**, Relay, Md., near Baltimore, has let general contract to Engineering & Contracting Corp., 504½ St. Paul Street, Baltimore, for five-story and basement building, 150 x 152 ft., on Halthrope Street, Baltimore, for new rack house, storage and distributing plant. Cost over \$75,000 with equipment.

**Bureau of Supplies and Accounts**, Navy Department, Washington, asks bids until March 19 for one motor-driven wood-working table router (Schedule 4489); until March 26, one motor-driven apron-type bending brake (Schedule 4494) for Portsmouth Navy Yard.

## ◀ PACIFIC COAST ▶

**Board of Water Commissioners**, Long Beach, Cal., will soon take bids for six steel water tanks, each 420 ft. circumference and 35 ft. high, for water supply system in Alamitos Hill district. Cost about \$265,000. Fred F. Porter, general manager, water department, is in charge.

**Pacific Can Co.**, 290 Division Street, San Francisco, has let general contract to J. A. Allen, 22 South Sutter Street, Stockton, Cal., for new two-story plant in Morning-side Industrial District, Stockton, using part of 20-acre tract recently acquired. Cost about \$60,000 with equipment. Other units will be built later. Ellison & Russell, Pacific Building, San Francisco, are consulting engineers.

**Bureau of Reclamation**, Denver, asks bids until March 20 for two 30-gal. and one 120-gal. electric storage water heaters; one electric water heater with tank and

motor-driven circulating pump; 11 electric-operated water coolers for Boulder power plant, Boulder Canyon Project, Arizona-California-Nevada (Specification 666-D); 35 30-gal. and one 120-gal. electric storage water heaters and auxiliary equipment for Grand Coulee Dam Project, Grand Coulee, Wash. (Specification 667-D).

**Olympic View Winery Association**, Alderwood Manor, Wash., care of William Watkins, Alderwood Manor, head, recently organized, plans new multi-unit plant in Snohomish County. Cost over \$50,000 with equipment.

**Vegetable Oil Products Co., Inc.**, 6100 Avalon Boulevard, Los Angeles, has let general contract to Atlas Scraper & Engineering Co., 6203 Maywood Avenue, Bell, Cal., for new one-story storage and distributing plant, 75 x 200 ft., at Wilmington, San Pedro Harbor district. Cost about \$30,000 with equipment. Hamilton G. Grady, 1572 Oak Drive, Los Angeles, is engineer.

**Bureau of Supplies and Accounts**, Navy Department, Washington, asks bids until March 19 for two watertube boilers and spare parts (Schedule 4484); until March 26, one motor-driven metal-cutting band saw (Schedule 4491); until April 2, 10 20-gal. steam-jacketed kettles (Schedule 4501) for Mare Island Navy Yard; until March 22, parts for airplanes (Schedule 900-8222) for San Diego naval station.

**W. P. Fuller & Co.**, 301 Mission Street, San Francisco, manufacturers of paints, varnishes, etc., have acquired former assembling plant of Ford Motor Co., at Seattle, and will remodel for new factory branch, storage and distributing plant. Fuller company has also let general contract to A. H. Wilhelm, 666 Mission Street, San Francisco, for extensions and improvements in storage and distributing plant at San Francisco.

## ◀ FOREIGN ▶

**Modern Machine Tools, Ltd.**, Coventry England, manufacturer of machine tools and parts, has acquired local site for new plant. Company is also negotiating for purchase of existing factory, totalling about six acres area, and will remodel for further expansion. Cost over \$100,000 with machinery.

**Commissariat of Heavy Industry**, Soviet Russian Government, Moscow, has placed

orders for initial equipment for new steel rolling mill at steel plant at Zaporozstal, Russia, with United Engineering & Foundry Co., Pittsburgh, totalling close to \$3,000,000. This will comprise part of program at this works, where several other mill units will be built. Entire project will cost over \$10,000,000. Plans are also under way for another steel mill at Lipetsk, Central Black Soil Region, to cost close to \$5,000,000 with equipment. Amtorg Trading Corp., 261 Fifth Avenue, New York, is official buying agency.

**State Railways**, Buenos Aires, Argentina, has secured approval of fund of 30,000,000 pesos (about \$9,750,000) from Government for expansion and improvements, including rail extensions and replacements, rolling stock and allied equipment, new locomotive and car repair shops with equipment, and miscellaneous construction.

**Airspeed, Ltd.**, Portsmouth, England, manufacturer of airplanes and parts, Swan, Hunter & Wigham Richardson, Ltd., Wallsend-on-Tyne, England, operating a ship-building plant, and Fokker Aircraft Co., Ltd., Amsterdam, manufacturer of large type aircraft, acting jointly, are organizing company to build plant at or near Wallsend-on-Tyne, for production of cabin airplanes and parts, with capacity of 30 passengers or more. New aircraft will be of Douglas type, for which Fokker company has European rights. Cost over \$200,000 with equipment.

**State Railways**, Buenos Aires, Argentina, asks bids until April 23 for equipment for 2000-kw. capacity power plant at Tafi Viego shops, including four 500-kw. d.c. generator units with accessories, water cooling and circulating equipment, switchboard and instruments, distribution equipment, etc.

## Refractories Directory Completely Revised

THE ninth edition of the directory of the refractories industry has just been issued by the American Refractories Institute, 1608 Walnut Street, Philadelphia, and Oliver Building, Pittsburgh. The directory consists of an alphabetical list of brands, an alphabetical list of members of the industry and a geographical location list of refractories manufacturers' plants. A particular feature of this edition of the directory is a large map showing the location of the various refractories plants throughout the United States. This map was especially prepared for the institute by J. H. Muirhead, 230 West 108th Street, New York.

## Reading Introduces Commercial Research

THE Reading Iron Co., Reading, Pa., has formed a commercial research department, composed of skilled technicians, whose services are available without charge to any prospective buyers of pipe. Members of the research department hold no brief for any particular kind of pipe, and their conclusions are based solely on the conditions of service and on the actual service records of various kinds of pipe under those conditions.